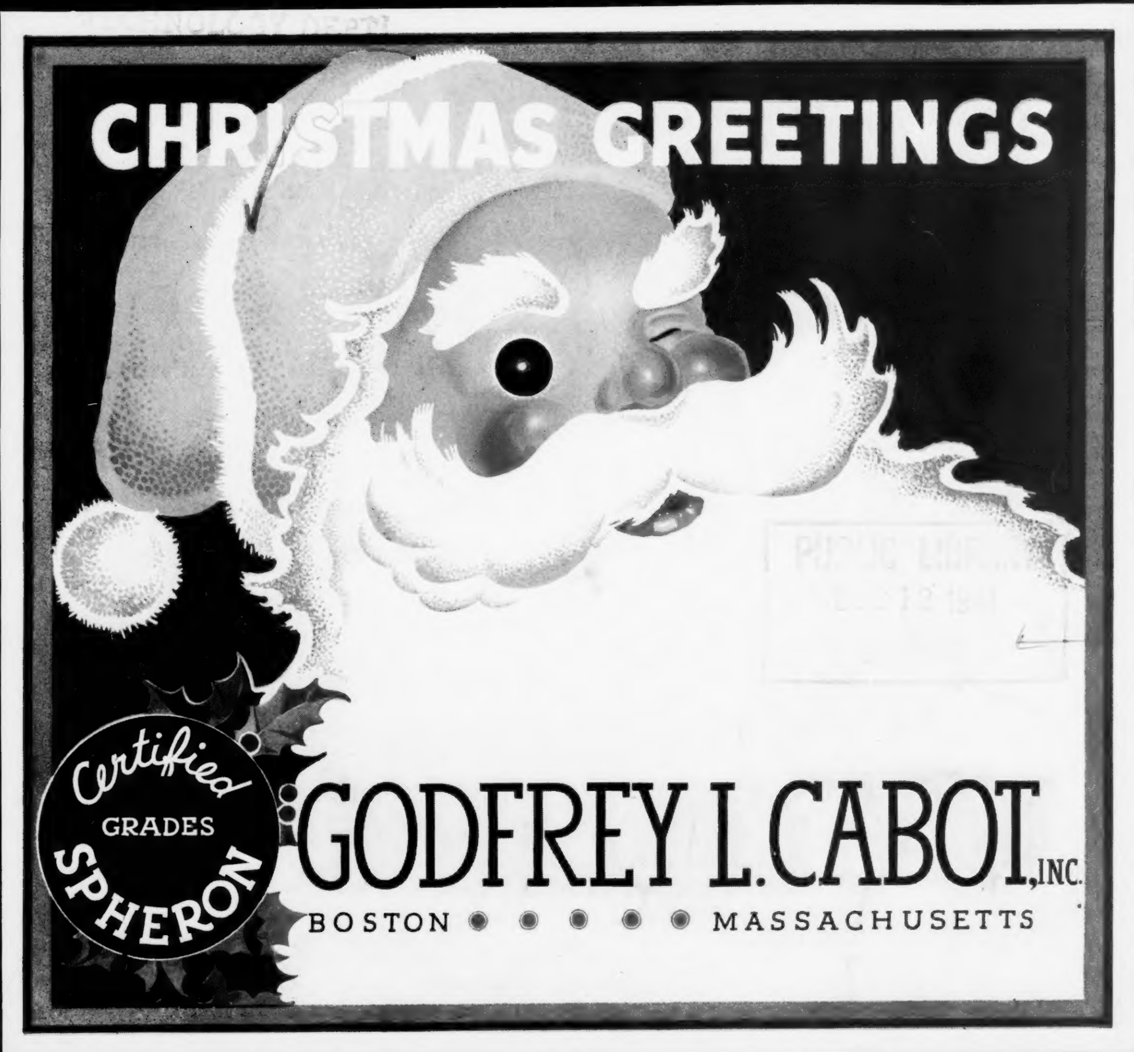
DECEMBER 1, 1941



INDIA RUBBER WORLD, December 1, 1941, Vol. 105, No. 3. Published monthly by BILL BROTHERS PUBLISHING CORP., 420 Lexington Avenue, New York, N. Y., U. S. A. Entered as second class matter October 5, 1889, at the Post Office at New York, N. Y., under the act of March 3, 1879. Subscription. $3.00 a year domestic; Mexico, $3.50; all others, $4.00; single copies, 35 cents.

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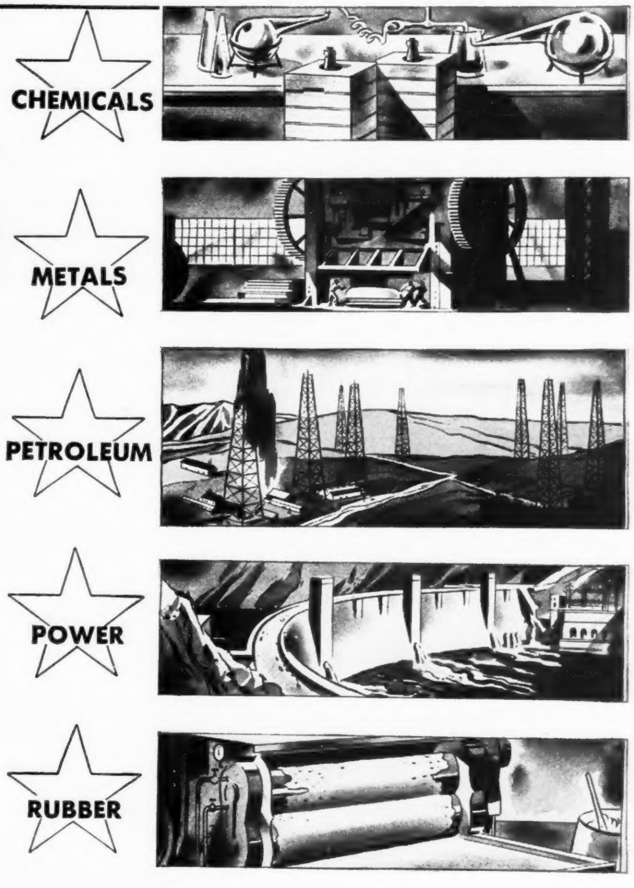

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December 1, 1941

VOLUME 105 **NUMBER 3**

A Bill Brothers Publication

INDIA RUBBER WORLD

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Published monthly by Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y. Chairman of Board and Treasurer, Raymond Bill; President and General Manager, Edward Lyman Bill; Vice Presidents, Randolph Brown, B. Brittain Wilson.

Subscription price—United States and Mexico, $3.00 per year; all other countries $4.00. Single copies thirty-five cents. Other Bill publications are *Premium Practice, Rug Profits, Sales Management, Soda Fountain, Grocer-Graphic,* and *Tires.*

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INDIA RUBBER WORLD

Published at 420 Lexington Avenue, New York, N. Y.

Volume 105 **New York, December 1, 1941** **Number 3**

A Central Organization for Fundamental Research on Rubber

Archibald T. McPherson[1]

Harris & Ewing

The Author

Abstract

A SKETCH of a proposed organization for research on rubber has been prepared at the suggestion of the editor of INDIA RUBBER WORLD. The organization is needed to conduct long-term, fundamental research on rubber and to stimulate more research throughout the rubber industry. In order to be successful the organization should have a staff of superior ability in research, a stable structure, and a managing board made up of men trained in science; furthermore it should be associated with a large scientific institution. Much information relative to organizations for research is given in two recent surveys on "Research—A National Resource."

FAR-SIGHTED leaders of the rubber industry have long recognized the need of more research on rubber, particularly research of a broad, fundamental character. Ambitious plans have been proposed from time to time for the sponsoring of such research by the rubber industry. The usual history of these plans is that they have been ably presented, discussed at length, and ultimately allowed to lapse. This paper reviving the subject is the outcome of a conversation with the forward-looking editor of INDIA RUBBER WORLD and is here presented at his suggestion in the hope that it may lead to new interest and ultimately to some tangible accomplishment.

The present plan, which involves no essentially new or original features, is that a relatively small, but strong, central organization be created to undertake difficult, long-term, fundamental research on rubber and at the same time to promote research in universities and in industry by cooperation, through the dissemination of information, and by other means.

The Present Status of Fundamental Research on Rubber

Before presenting a sketch of the proposed organization, it is in order to take stock of the present resources for research. Any new plan that may be proposed should meet an actual need and should be designed to supplement the research now being done rather than to uproot and rebuild the present organizations.

The present situation regarding fundamental research on rubber can be presented in simple form by asking and answering certain relevant questions. What is fundamental research? Where is fundamental research on rubber now being done? Who is doing it? Wherein are the present accomplishments inadequate?

1. Definition of Fundamental Research

Fundamental research is the obtaining of scientific data and the formulation of broad, underlying scientific principles. It is motivated by scientific curiosity and is

[1] Chief, Rubber Section, National Bureau of Standards, Washington, D. C.

undertaken without thought of immediate application or early financial return.

Applied research, on the other hand, generally relates to projects of a specific and often confidential nature with a definite commercial objective requiring an early solution of the problem. Some applied research, however, is broad in scope and thorough in method and differs from fundamental research only in that it is motivated by the hope of reaching practical ends. This type of work has been aptly designated as *pioneering* applied research.

Numerous fascinating examples of the different kinds of research are cited in two recent publications of the National Resources Planning Board entitled "Research—A National Resource. I. Relation of the Federal Government to Research. II. Industrial Research."[2] These publications, which were prepared by a number of prominent scientists and industrial leaders, contain a wealth of information about the problems, personnel, organization and management, expenditures, and typical accomplishments of government and industrial organizations for research.

2. Organizations Engaged in Fundamental Research

Contributions to the basic knowledge of rubber come from a great number and variety of organizations the world over. No one country and no one type of organization have a monopoly on research. The results of most fundamental investigations on rubber, and many applied investigations as well, are published in *Rubber Chemistry and Technology*. The principal sources, in the United States, of papers which appear in this periodical are: firms producing compounding ingredients and synthetic rubber, manufacturers of rubber goods, universities and colleges, users of rubber products, and government bureaus.

Most of the research done in the university and the government laboratories is fundamental. Some of the contributions from the industrial laboratories are fundamental research; more of them, however, represent pioneering applied research, and still more, simple applied research.

The foreign papers in *Rubber Chemistry and Technology* come from similar sources, and in addition from institutions for research on rubber which find no counterpart in the United States, such as the Rubber Research Institute of Malaya or the Netherlands Government Rubber Institute. Three new institutions have been created within recent years in connection with the International Rubber Regulation Agreement and have as their objective the development of new and increased uses for rubber. One of these organizations, the British Rubber Producers' Research Association, has undertaken a broad program of fundamental research as a long-term means of increasing the consumption of rubber. This program is being followed in spite of the war, and, although work appears to have gotten under way only last year, eleven substantial papers have already been published.

Fundamental research is being sustained in Germany also. Some of the papers which are being published in German rubber journals deal with projects which a practically minded American budget committee would regard as academic luxuries even in time of peace.

3. Personnel Engaged in Research

Some of the fundamental research on rubber is done by fortunately situated individuals who are privileged to work in well-equipped laboratories and devote their whole time to research. Much of the research, however, is done by busy individuals who have numerous other duties. Sometimes it partakes of the nature of a hobby or an avocation. In nearly all cases research, like other creative work, is done by men who are genuinely interested in it and want to do it even to the point of making sacrifices for the privilege.

The men themselves who do research on rubber come from all ranks and differ widely in qualifications and abilities. In the author index of *Rubber Chemistry and Technology* some of the highest salaried executives of the industry rub shoulders, figuratively speaking, with junior laboratory assistants and apprentices; while the president of a great university is accorded no distinction over teachers from small colleges.

4. Inadequacy of the Present Research

The principal trouble with fundamental research on rubber, as it is now done, is that there is not nearly enough of it. The effort devoted to obtaining new knowledge is disproportionately small in comparison with the large amount of time and money which are spent in applying existing knowledge. In the year 1937, for example, it was estimated that 2,518 persons in the rubber industry in the United States were engaged in research. In the same year only about 20 research papers were published in the United States which might be classed as representing either fundamental or pioneering research. There were approximately 30 authors, a third of whom were employed in university and government laboratories.

Another difficulty is that sufficient attention is not now given to problems which call for long study, extensive equipment, and the coordinated effort of men having different types of training. A great deal of valuable research can be done by individuals, even when working alone and for part time, but there is an increasing need, with the growth of science and industry, of group research by a well-coordinated organization.

Objectives of Proposed Organization

To meet the needs pointed out in the foregoing paragraphs it is suggested that the proposed organization have as its primary objective the conducting of long-term, fundamental research, and, as a secondary objective, the stimulation of research elsewhere by cooperation with other organizations, by the dissemination of information, and by a campaign of education.

1. Program of Research

The problems for study by the organization should be chosen from the standpoint of providing systematic, scientific knowledge of rubber. In deciding among numerous possible lines of investigation the question should be asked, "Which investigations are the most likely to open up a significant and hitherto unexplored body of knowledge regarding rubber?"

In undertaking to answer this question it would be desirable to make a systematic survey of the constants, properties, reactions, and types of behavior of rubber. The perennial lists of "Unsolved Problems of the Rubber Industry" would probably be of little help because most of the problems in such lists call for applied rather than fundamental research; furthermore, the important discoveries to be made regarding rubber are discoveries which are not anticipated.

[2] Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price of the first is 50¢, and the second, $1.

It is characteristic of fundamental research that the ultimate value of the work often lies in results which were not the immediate objectives of the investigation and could not have been anticipated any more than our vast oil fields could have been anticipated by the early Spanish explorers who prospected the very regions looking vainly for gold and silver. Large and important discoveries are often said to come by chance. Serendipity, however, is a better word than chance since it implies that the investigator must be alert and open-minded enough to realize the significance of an unexpected observation.

In order to give research workers latitude to follow up new and unexpected developments it would seem desirable for the managing board of the organization to decide only on the general fields for investigation and leave specific projects and methods to the workers. The board, for example, might decide on the study of the electrical behavior of rubber, but the decision as to the amount of attention which would be paid to piezoelectrification, dielectric strength, or electric moments would rest with the research men themselves.

2. Information Service

The giving of information is logically a function of a research organization. Investigational work requires a wide and thorough acquaintance with the literature. Research men must of necessity accumulate a large store of general and background knowledge of the entire field of rubber science and technology. When this knowledge is in hand and is well organized, it can be passed on to others with relatively little effort and expense. A great deal of research could be stimulated in small and isolated laboratories by making available to them information and literature on the problems in which they are interested. An information service might easily justify its cost by saving some of the time and money which are spent in the needless rediscovery of facts and principles already recorded in the literature.

A distinction would, of course, have to be made between the giving of information and trouble-shooting. The unfortunate experience of other research organizations has shown that where trouble shooting is undertaken as a secondary activity, it almost invariably encroaches upon research to such an extent as to become the major activity.

The development of the information service could be facilitated by coordinating it with the well-known Information Bureau of the Research Association of British Rubber Manufacturers and avoiding any unnecessary duplication of services or activities.

3. Cooperation with Universities in Research

The proposed organization could stimulate a wide variety of fundamental research by collaborating with colleges, universities, and other institutions in problems which lie on the borderline between rubber investigations and other fields. For example, an academic investigator in some special field such as X-ray diffraction, spectroscopy, or magnetic susceptibility may wish to make some measurement on rubber, but may be handicapped by the lack of suitable specimens and by unfamiliarity with the general properties and behavior of rubber. It would be a relatively easy matter, then, for a well-equipped organization doing research on rubber to supply the necessary background information and provide adequate material for experimental needs. Such collaboration would lead to more and better research work than either party could do alone.

4. Stimulation of Research in Industry

An organization of the type here contemplated would occupy a position of leadership in fundamental research and in this position could properly conduct a sustained campaign of education to promote a better appreciation of the value of research on the part of industry. In the industry many able research men are advanced to administrative positions on account of the ability which they have shown in research, but in the higher positions they are barred by circumstances from further scientific accomplishments. A few hardy scientists who have risen to high places in the rubber industry have continued to do noteworthy research, but the majority have been lost to science.

This loss is large and unnecessary because many of the men could do worthwhile research in a part of their time. Furthermore their value as administrative officers would be increased in the long run by their maintaining their scientific interests and point of view. Any one who doubts the practicability of part-time research should consider the average university professor who teaches, writes textbooks, participates in public affairs, and serves on endless committees, but nevertheless finds or makes time for fundamental research. Research is a tradition of the universities; it should become a tradition of industry as well.

The proposed organization could check another and even more needless waste by encouraging the publication of valuable fundamental data obtained in connection with practical studies. Such data are sometimes buried in company files because policies do not permit the publication even of work of wholly academic interest. More often, however, the failure to publish arises from the fact that the firm does not allow the research man who has done the work enough time to round out and write up the results in a form acceptable for publication.

Requisites of an Organization for Fundamental Research

An organization for fundamental research differs greatly from an organization set up for business or manufacture. Research cannot be done on an assembly-line basis. Some of the very methods by which a business may be run successfully will wreck a research organization. Some general principles can be laid down which must govern the formation and management of the proposed organization if it is to accomplish its intended purpose. Wholehearted acceptance of these principles will go far toward assuring the success of the organization irrespective of how many of the details may be worked out.

1. The Organization Should Be Made Up of Research Men of Superior Ability

A prime requisite of an organization to undertake difficult fundamental research is that it should attract and hold men of superior ability. A relatively small group of such men could accomplish more of the type of work here contemplated than a large staff of mediocre individuals. Able research men are hard to get so that a new organization would have to make a small beginning and get under way slowly. Fortunately the proposed organization could offer inducements relating to the nature of the work and the working conditions which would have more weight with the type of men sought than salary alone.

The research staff should be selected not only from a consideration of the qualifications of the individual men,

but also with a view to building up a unit or units comprised of men having supplementary types of training. In some cases men of the qualifications sought cannot be found, but will have to be developed.

2. The Organization Should Have Stability

Research always requires a great deal of time. The broader and the more fundamental the research, the less practical it becomes to push it through to completion according to a predetermined schedule. In order to allow time for thorough and unhurried work to be done, the proposed organization should be managed and financed with the utmost regard for stability. A modest budget assured over a period of years would be vastly preferable to a large annual budget in which the allotment for each project had to be justified by the showing made during the previous year. Sure fire projects which can be counted upon to make a good showing in a relatively short time represent a type of work which the proposed organization should shun.

3. The Management Should Consist of Men Trained in Science

Since the requirements of research are so different from those of business or production, the board of directors or the committee set up to administer the affairs of the proposed organization should be made up of men who have themselves been trained in science and are sympathetic toward fundamental research. Fortunately there are such men among the leaders of the rubber industry.

4. The Organization Should Be Associated with a Large Scientific Institution

Any program of fundamental research on rubber will require an extensive background in all the natural sciences; hence the proposed organization should be connected with a large institution for scientific research so that its staff could associate freely with specialists in the various fields of physics, chemistry, mathematics, and engineering. The library, laboratory, and shop facilities of the large institution would, of course, be far more extensive than those which any research unit could hope to maintain independently. There are several universities and institutions for research and at least one government bureau which might afford a suitable location for the proposed organization.

Establishment of the Proposed Organization

The present discussion has been intentionally confined to presenting the need of active support of fundamental research and pointing out how a strong, central organization might effectively meet this need. The experience of other industries has indicated that when the importance of fundamental research is realized, means will be found for setting up and maintaining an adequate organization for conducting the research. The Textile Foundation and the American Petroleum Institute, for example, were established under different circumstances and operate under different plans, but both function very effectively in getting fundamental research done.

The support of an organization for fundamental research should present no serious problem to the rubber industry. An annual budget of, say, $100,000 would represent a large outlay as expenditures for fundamental research go, but it would amount to only about 1% of what the industry is now spending for applied research and would represent less than 0.01% of the annual volume of business of the industry.

If the American rubber industry can be brought to realize the potential value of fundamental research, it has able leaders who can initiate an adequate organization for research, and it possesses ample resources from which to provide the necessary support.

Whitehouse on Retreading

In a recent report[1] on rubber conservation by the United States Tariff Commission, Washington, D. C., it was pointed out that 30,000,000 tires could be retreaded annually by tire manufacturers in molds ordinarily used for making new tires. This volume, added to the capacity of existing retreading shops (10,000,000 tires a year), would provide a total capacity of 40,000,000 tires a year. In a recent interview with Frank H. Whitehouse, of the Tariff Commission, certain phases of this report were discussed, particularly in respect to the question of the availability of used tires for retreading. Mr. Whitehouse informed us that it was his understanding that 50% of the used tires turned in would be satisfactory for retreading *in molds used ordinarily for making new tires only;* that in addition, about 10,000,000 tires could be retreaded in the special adjustable molds used by retreading shops.[2]

Therefore, if 60,000,000 new tires were produced yearly, and 60,000,000 used tires were turned in yearly, about 30,000,000 (50%) would be satisfactory for retreading by the tire manufacturing industry, according to Mr. Whitehouse. Also 10,000,000 of the balance of 30,000,000 tires could be retreaded in retreading shops, making a total of 40,000,000 tires. It was further pointed out that the production of new tires in 1939 and 1940 approached 60,000,000 units yearly, and the average life of a tire is estimated at 2 to 3½ years. However one tire manufacturer reported that he estimates the tire replacement market on the basis of automobile sales two years previously. In any event, according to Mr. Whitehouse, it appears that about 60,000,000 tires will be discarded in 1942 if not in 1941 (probably 7,000,000 or more of these 60,000,000 will be retreaded).

Mr. Whitehouse further disclosed that he had been told by a representative of a large retreading firm that a number of large tire manufacturers had tried retreading in regular tire molds in past years and found it unsatisfactory because retreading from bead to bead was required which involved curing the sidewalls again. Accordingly these firms decided to use special adjustable molds, it was said. Mr. Whitehouse, however, held that, although not so satisfactory as special retreading molds, new-tire molds can be used in an emergency. In this connection it was pointed out that the previously mentioned Tariff Commission report was written on the basis of the best that leaders in the industry thought could be accomplished in the event of a great emergency.

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[1] INDIA RUBBER WORLD, Nov. 1, 1941, page 156.

[2] It has been estimated that 20,000,000 tires could be produced yearly in established retreading shops on a two-shift (80-hour week) basis. "The United States Rubber Industry. September, 1941" by E. G. Holt, Industrial Reference Service—Part 10. Rubber and Its Products, October, 1941, No. 35, p. 130.

Cold Vulcanization of Rubber under Stress[1]

A. W. Beucker[2]

ALTHOUGH rubber is a very widely used commodity, and one that has been known for a great many years, still comparatively little is known of its structure and of its exact chemical composition. Before rubber could become a commercially important article, the process of vulcanization had to be discovered. This happened just about a hundred years ago. It was then learned that when sulphur is added to rubber in an appropriate manner, a product is obtained which is not tacky, but is tougher, more resistant to temperature changes and organic solvents, and better in almost every respect than the crude rubber used at the start.[3]

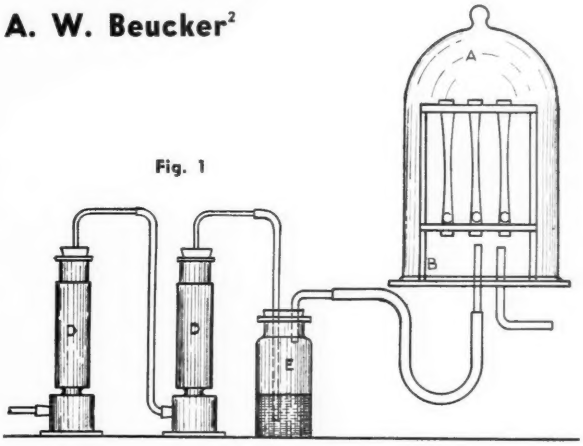

Fig. 1

Introduction

Shortly after the discovery of vulcanization it became known that the amount of sulphur mixed with the rubber profoundly influenced the properties of the vulcanized rubber. For small amounts of combined sulphur (up to 6%) the product obtained was known as soft rubber and was characterized by great elongation and fairly high tensile strength, ranging from 2,000 to 4,000 pounds per square inch. When the amount of combined sulphur reaches 30%, figured on the weight on the rubber, we obtain what is known as hard rubber or ebonite. Hard rubber has a very low elongation and a high tensile strength, ranging from 8,000 to 10,000 pounds per square inch.[4] It would be expected that in the range between soft and hard rubber an intermediate product would be obtained which would show decreasing elongation and increasing tensile strength. This, however, is not the case. The intermediate product shows both decreasing elongation and decreasing tensile strength.[3] Before attempting to explain this phenomenon, it is advisable to explore more thoroughly the structure of rubber.

Rubber may be considered as being composed of a number of isoprene units tied together end to end.

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In unvulcanized rubber these long chain molecules are lying about in random orientation. In the vulcanization process sulphur combines with the rubber molecule by either or both of two methods: i.e., *Inter*molecular[5] or *intra*molecular[6] addition. In soft rubber this addition occurs in such a manner that the chainlike molecules are still free, being able to slip past each other and extend, indicating that sulphur, in this instance, adds across the double bond; whereas in hard rubber it would appear that sulphur not only adds across the double bond, but links different molecules together so that they are no longer free to slip about or further extend. When soft vulcanized rubber is stretched, the molecules line up to give a more and more fiberlike structure with each fiber bearing only a small part of the load, while in hard rubber nothing lines up, but, owing to the great quantity of sulphur taken in, there is such a compact mass that a great force is required to rupture it. In the intermediate state the molecules are still free to orient themselves, but not to so great an extent as in the case of soft rubber; consequently since only a few fibers are bearing the load at any one time, the tensile strength drops.

The above explanation would require a predominantly *inter*molecular addition of the sulphur. If we stretch the rubber and then cure it in that stretched condition, the following should be the case if *inter*molecular addition is predominant.

1. As the stretch during cure increases, the permanent set[7] should increase. The increased proximity of the molecules due to the stretching encourages the *inter*molecular addition of sulphur, which correspondingly increases the bulk of the molecule and retards its impulse to return to the position of its components.
2. As the stretch during cure increases, the amount of combined sulphur should increase. Same reason as above.
3. As the stretch during cure increases, the tensile strength should rise because of the greater orientation of the molecules paraxial to stress.
4. There should be no leathery rubber range in rubber cured under stretch.
5. In the greater elongations we should obtain an X-ray fiber diagram. It is known that when uncured rubber is stretched, we obtain a fiber diagram. It is also known that vulcanized rubber, if stretched, gives an X-ray fiber diagram. The cold vulcanizing process as used in this investigation should not influence the appearance of a fiber pattern.

It is apparent from the discussion thus far that an investigation of the properties of rubber vulcanized in the cold under stretch should yield information which might enable us better to decide whether or not the sulphur adds *inter*molecularly or *intra*molecularly.

Some work on the vulcanization of rubber under stretch has already been done. Busse,[8] of the B. F. Goodrich Co., has obtained a patent on the cold vulcanization of

[1] Presented before the New York Group, Division of Rubber Chemistry, A. C. S., Oct. 17, 1941, as winner of the third prize in the 1941 Essay Contest sponsored by the New York Group.
[2] Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J.
[3] K. Memmler, "Science of Rubber", Reinhold Publishing Corp., New York (1934).
[4] "The Vanderbilt Rubber Handbook", Seventh Ed. R. T. Vanderbilt Co., New York (1936).
[5] *Inter*molecular addition is defined as the connecting of two or more molecules by their mutual combination with a third.
[6] *Intra*molecular addition is defined as the simple addition of one molecule or atom to another.
[7] Permanent set as used in this investigation is defined as the percentage of original length which the sample retains after vulcanization in the stretched position.
[8] W. F. Busse, U. S. patent No. 1,909,455 (1933).

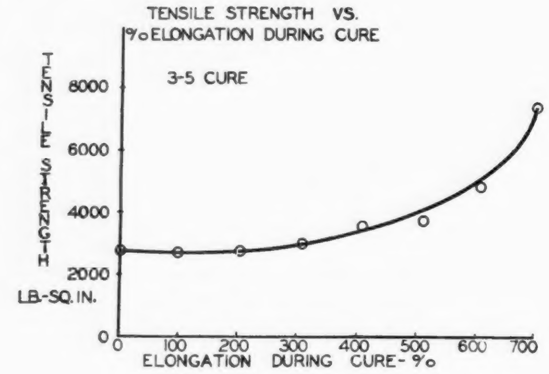


Fig. 2

rubber under stress. He found that when rubber is vulcanized under stress, it retains most of its elongation, and the tensile strength rises as the elongation during cure increases. He did not, however, make any mention of combined sulphur or the formation of an X-ray fiber diagram.

Smith[9] wrote a thesis in 1939 at Massachusetts Institute of Technology on the vulcanization of rubber under stress. He found that the tensile strength of the rubber dropped as the elongation during cure was increased, and that the permanent set decreased as the stress during cure increased. He also found that the amount of combined sulphur remained constant, and that there was no indication of an X-ray diagram.

Busse worked with latex films which were vulcanized in an atmosphere of sulphur chloride; while Smith worked with latex films in which sulphur and accelerator had been incorporated, but which were vulcanized by immersion in boiling water.

We, therefore, have here two processes essentially the same in regard to the formation of rubber vulcanized under stress, but giving diametrically opposite results in regard to tensile strength. Consequently an investigation with the main purpose of endeavoring to reconcile these results would seem very instructive and useful.

Object

An investigation of the properties of rubber cold cured under stress will prove interesting and informative from two standpoints. It should throw some light on the discrepancy in the results obtained by Busse and by Smith and give us an indication as to the way in which the

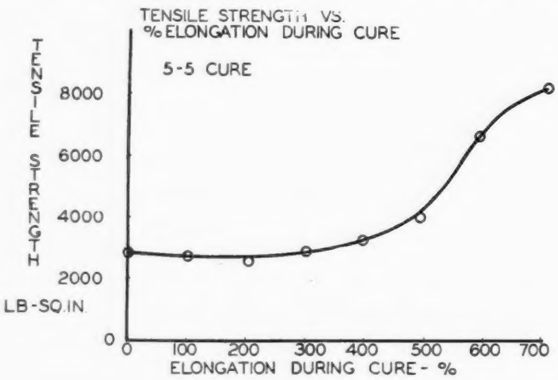


Fig. 3

sulphur-rubber addition occurs during vulcanization. During this investigation the author intends to use only two variables. One will be the amount of sulphur introduced into the rubber, and the other the amount of stretch during cure. In this paper, only the lower ranges of combined sulphur will be studied as it was felt that with small amounts of combined sulphur a better indication as to the trend of the properties would be obtained.

We, therefore, have as the purpose of this paper an investigation of the physical and chemical properties of rubber vulcanized under stretch, using the two variables of combined sulphur, and stress during cure, with the ultimate idea of throwing further light on the structure of vulcanized rubber.

Experimental Procedure

If we are to obtain results which will be comparative and, to a certain extent reproducible, our samples must be treated identically during the three major processes: namely, preparation, vulcanization, and testing. We will use just one variable for each cure: namely, the amount of stretch. Each sample will have a history as follows:

1. Pouring the latex into forms to obtain films.

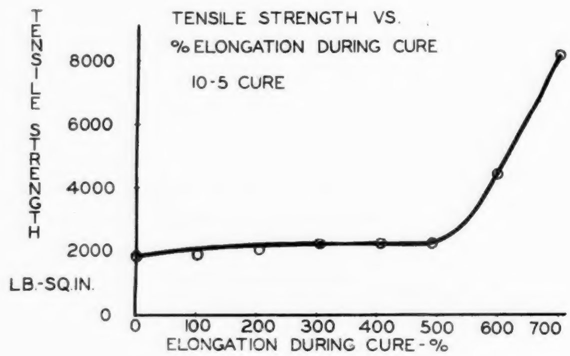


Fig. 4

2. Storing the latex film in a calcium chloride desiccator for one week.
3. Cutting the film into strips.
4. Stretching the strips to the desired elongation.
5. Vulcanizing the strips in the stretched condition.
6. Measuring the permanent set acquired during cure.
7. Determination of modulus and tensile strength.
8. Determination of combined sulphur.
9. Obtaining X-ray diagrams.

In pursuing this investigation we found three general methods open to us. These methods are dependent upon the three forms in which rubber is available and are best explained as follows:

1. Masticated rubber still is the most important raw material from an industrial point of view. However in an investigation of this kind it presents a number of difficulties which would have to be overcome. The primary difficulty in the use of masticated rubber would be the fact that it flows when stretched. While this flow can be retarded to a large

[9] I. N. Smith, "Vulcanization of Rubber under Stress", S. B. thesis, Chem. Eng., M. I. T. (1939).

extent by subjection to a slight preliminary vulcanization, this process introduces another variable, and since we are anxious to minimize our variables, it was decided to eliminate the use of masticated rubber.

2. Unmasticated raw rubber in the form of smoked sheets or crepe suggests itself. However since it is necessary to use sulphur chloride as the vulcanizing agent in order to use the rubber in its unmasticated state, the fact that neither smoked sheets nor crepe can be procured in thin enough sheets to permit the proper combination of the sulphur rendered this form of rubber impracticable for our purposes. The very rough surfaces of these unmasticated rubbers would present additional difficulties.

3. Latex is the third possibility. The advantage of latex films, which can be made as thin as desired, becomes apparent when it is realized that these films, made by allowing the water to evaporate from the latex, have practically no cold flow when

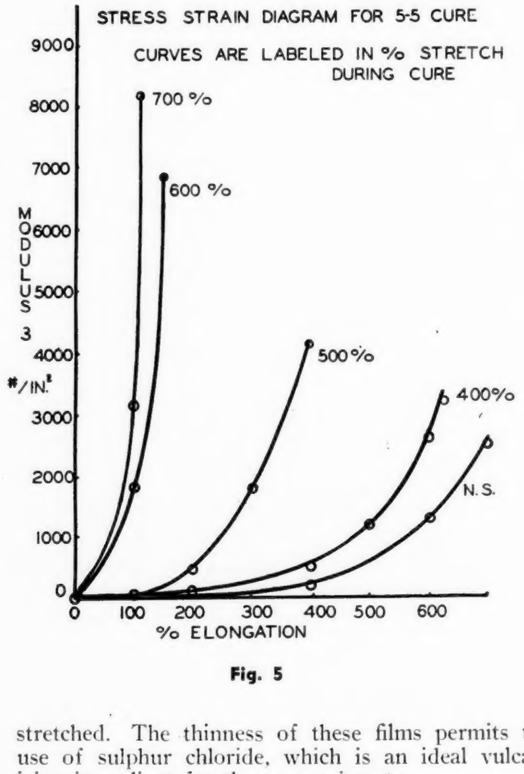


Fig. 5

stretched. The thinness of these films permits the use of sulphur chloride, which is an ideal vulcanizing ingredient for these experiments.

The vulcanizing agent can be introduced into the latex by either of two methods: by the use of a dispersion of sulphur, or of sulphur chloride. In the use of a sulphur dispersion an accelerator must be used, and great care must be exercised to keep the samples at a low temperature, since to effect a cure in boiling water an ultra-accelerator must be used.

As the use of a dispersion permits of the possibility of introducing more variables, it seems that sulphur chloride would be the better agent for the purposes of this investigation. Admitting the superiority of latex for our purposes, cognizance must be given to the difficulties which will be encountered. Great care will need to be exercised in the pouring of the films so that the resulting sheets of rubber will be of uniform thickness. Furthermore, since water has a tremendous effect on the tensile and modulus tests, extreme care must be taken to

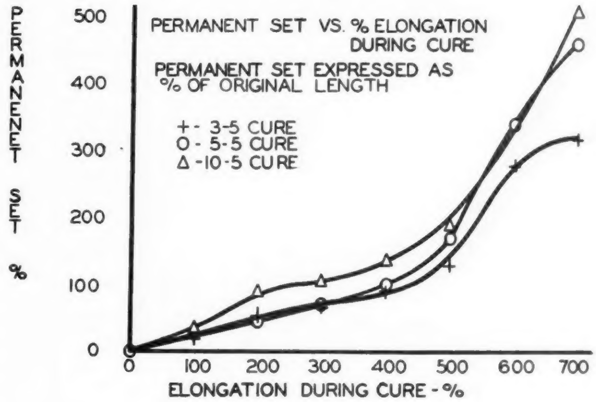


Fig. 6

effect as complete an elimination of water from the sheets as possible.

It was easy to decide upon the method of modulus and tensile testing, as there was no reason for deviating from the standard methods of the A.S.T.M.[3]

The analysis for sulphur offered no difficulties. The samples were extracted with acetone on a standard A.S.T.M. extraction apparatus.[3] The extracted sample was then treated by the standard method for "total sulphur" given in "The Vanderbilt Rubber Handbook,"[4] thus permitting the evaluation of combined sulphur.

PREPARATION OF FILMS. Films were made by pouring 60% centrifuged latex into forms and allowing the water to evaporate into the air for 24 hours. After this period of air drying the films were removed to a desiccator where they were held for one week. Cardboard was placed between the rubber sheets to prevent contact and consequent adhesion. The cardboard was porous enough to allow circulation of the air, which insured complete drying. After the week's drying in the desiccator the sheets were cut into one inch strips and were ready for the vulcanizing process.

VULCANIZATION. As previously decided, sulphur chloride was used as the vulcanizing agent. The strips to be stretched were placed in the stretching frame and stretched by hand to the desired elongation. Immediately following this operation the frame was placed into a bell jar, and the clamps were tightened. A vaseline seal together with the clamps rendered the connection between the bell jar and the plate underneath gastight.

Since the samples were then ready for vulcanization we proceeded as follows: Dry air saturated with sulphur chloride was passed over the samples to be vulcanized. The apparatus used for this purpose is shown in Figure 1.

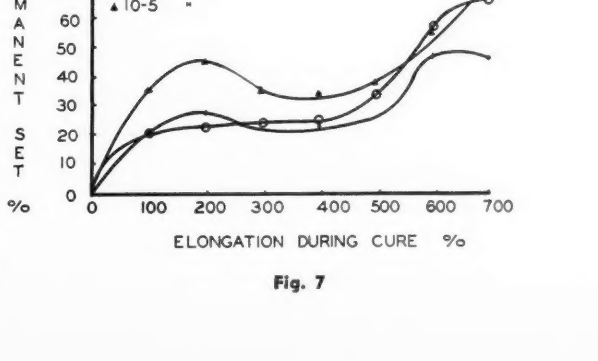


Fig. 7

In Figure 1 air comes in from the compressed air line and passes through the drying bottles filled with calcium chloride (*D*), from there it bubbles through sulphur chloride in the bottle (*E*). The sulphur chloride saturated air passes into the bell jar (*A*) and over the stretched latex film sheets (*C*) held in the stretching frame (*B*). The gases are then bubbled through a caustic solution and pass out of the window.

Cures are reported in the following fashion. A 10-5 cure means that for 10 minutes air saturated with sulphur chloride was blown over the samples, followed by a flushing with plain air for five minutes to remove the sulphur chloride from the bell jar. The time of cure was determined by using a convenient electric clock, and it is expected that no greater error than five seconds was made in the measurement of the time.

After cure the samples were removed from the frame and placed in running cold water to wash off any sulphur chloride which might have been adsorbed on the surface. Great care was taken not to touch the stretched portion of the sample either during or after cure.

Samples were marked before stretching so that the amount of permanent set would be readily obtainable.

PHYSICAL TESTING. After vulcanization the length of the samples between the gage marks was measured, and from this measurement the permanent set was calculated. The modulus and tensile testing was done on a Scott tensile machine, using one-inch dumbbell samples. The procedure recommended by the A.S.T.M. was followed throughout the physical testing.[3]

ANALYSIS. For the purpose of this investigation the combined sulphur was the only type of sulphur in the rubber in which we were interested. One of the six samples vulcanized was used for the sulphur analysis. A portion of the sample between the gage marks was cut up into small cubes and extracted for 24 hours in the A.S.T.M. standard apparatus for rubber extraction with acetone at 56.1° C. The extracted sample was then treated with bromine and perchloric acid by the method of Mackay as given in "The Vanderbilt Rubber Handbook."[4]

APPARATUS. Glass forms were made by cementing one-inch strips of glass on plates of common window glass, using Canada balsam. The stretching frame was equipped with thumbscrews to be tightened, after the rubber has reached the required elongation. Thin strips of rubber were placed between the iron jaws of the clamp and the sample to prevent slippage.

The vulcanizing chamber has been discussed under the subject of vulcanization.

Standard 10-inch desiccators were used.

MATERIALS. The latex used was 60% centrifuged latex, preserved with ammonia, and was obtained from the Heveatex Corp., Melrose, Mass.

Results

1. Up to elongation during cure of about 400% no change in the tensile strength of the rubber is to be found. At elongations during cure of greater than 400% the tensile strength increases as the elongation increases. (Figures 2, 3, and 4.) The greater the stretch during cure the stronger the sample.

2. The ultimate elongation of the sample decreases as the elongation during cure increases (Figure 5).

3. Permanent set, expressed as percentage of original length, increases as the stretch during cure increases (Figure 6).

4. Permanent set, expressed as percentage of stretch, passes through a maximum at about 200%, then decreases, and finally increases as the stretch during cure increases (Figure 7).

5. The moduli increase rapidly with increase in stretch during cure (Figure 5).

6. Combined sulphur passes through a maximum at about 200%, then decreases, and finally increases as the stretch during cure increases (Figure 8).

7. If the sample of stretched rubber be warmed, it will lose a great part of its permanent set.

8. Rubber cured at an elongation of 200% shows no X-ray fiber diagram; rubber cured at an elongation of 400% gives the first indication of an X-Ray fiber diagram; and rubber cured at 700% elongation shows a very definite fiber diagram (Figure 9).

9. Rubber cured at an elongation of 700% and then warmed loses its fiber diagram (Figure 9*J*.)

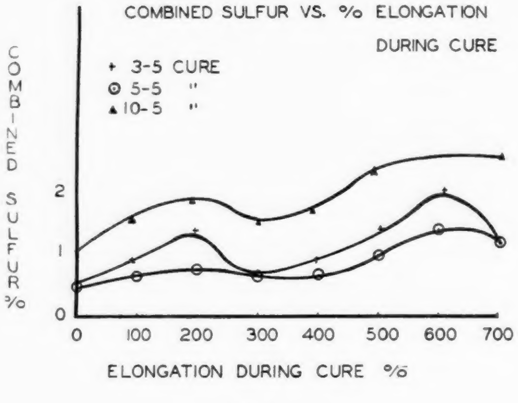


Fig. 8

Discussion of Results

There are a number of things which may be said about the structure of rubber from a study of what has been done previously in this field. From various decomposition experiments and, more lately, synthesis experiments, it can be said that rubber consists largely of isoprene units, C_5H_8, containing on the average one double bond per unit. These isoprene units are in long chains. These chains in unstretched rubber are not oriented, but when the rubber is stretched, the chains orient themselves with their long axes in the direction of the stretch. This theory has been substantiated by X-ray studies.

The vulcanization process causes the rubber and the sulphur to combine chemically. While the exact mechanism of this reaction is still unknown, there seem to be two possibilities by which the sulphur could add to the rubber. It could either add by cleaving the double bond in the molecule (*intra*molecular), or it could join two rubber molecules in the form of a sulphur bridge (*inter*molecular).

If rubber is stretched, the molecules line up and the cross-section decreases, which indicates that the chains must have been forced closer together. Let us now assume that we have a piece of rubber and have stretched it. Let us also assume that the sulphur adds *inter*molecularly to the rubber during vulcanization. When the sulphur adds to the rubber, the molecule at least doubles in size, and thus it is not easy for the new molecule to return to the position held by its components be-

fore stretch. This gives us the phenomenon of permanent set. The stretching of rubber straightens out the molecules and brings them closer together, thus facilitating the addition of sulphur. Consequently the more the rubber is stretched, the easier it is for sulphur to add. Our experimental data (see Figures 6 and 7) bear out the contention that as elongation during cure progresses, the size of the molecule is increased, thus increasing the permanent set.

The tensile strength of rubber cured under stress should be greater than that cured without stress. If we assume that rubber owes its tensile strength to the fact that there are an enormous number of tiny fibers or molecules lined up the same way, at the breaking point, with each carrying its share of the load, it is logical to assume that the more of the fibers that are lined up, the greater will be the tensile strength of the rubber. Since the vulcanization of rubber increases the size of the molecules, and restricts their free movement, the vulcanization of rubber under stress would set these chains or fibers in a position to bear the load. Therefore with more fibers paraxial to the stress at the breaking point the tensile strength of the rubber vulcanized under stress would be greater than a similar piece of rubber vulcanized without stress. (See Figures 2, 3, and 4).

The above phenomena for the vulcanization of rubber under stress all assume that the fibers have lined up paraxially with the stress. Accordingly, we should not get too many of the characteristics of rubber cured under stretch until we are in the fiber range. Our experiments show that tensile strength, combined sulphur, and permanent set all begin their rise at about 400%. The X-ray diagrams show that at 400% elongation during cure fiber formation is beginning, while at 700% elongation during cure the fibers are almost completely oriented in the direction of the stretch. If rubber stretched beyond 400% elongation during cure is slightly heated (body temperature), it will retract to a permanent set corresponding to rubber cured under identical conditions, but only being stretched during cure to 400%. The pronounced X-ray fiber pattern of the stretched sample disappears. This indicates that, under the vulcanizing conditions used in this investigation, the additional sulphur, at elongations higher than 400% during cure, does not reenforce the ultimate structure to the extent that the acquired permanent set remains unaffected by increasing temperature.

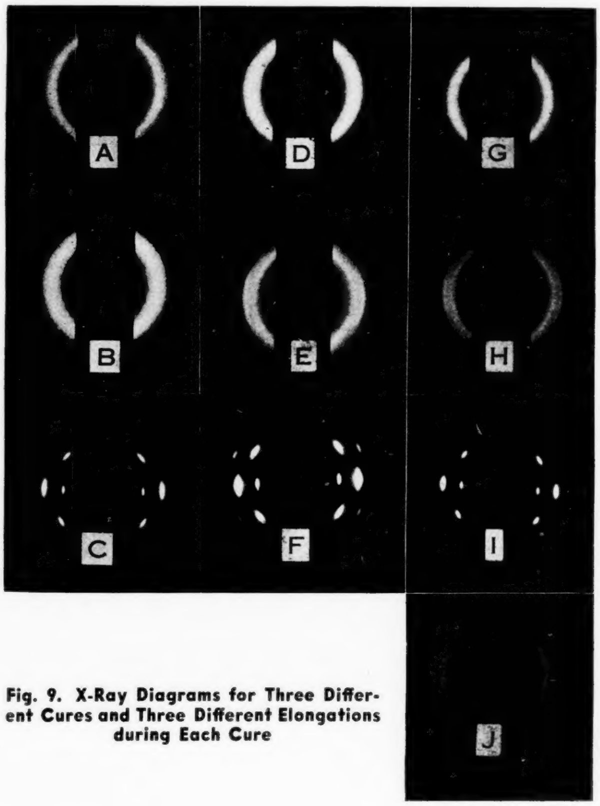


Fig. 9. X-Ray Diagrams for Three Different Cures and Three Different Elongations during Each Cure

Sample	Cure	% Elongation	Sample	Cure	% Elongation	Sample	Cure	% Elongation
A	3-5	200	D	5-5	200	G	10-5	200
B	3-5	400	E	5-5	400	H	10-5	400
C	3-5	700	F	5-5	700	I	10-5	700
						J*	10-5	700

*Sample Warmed to Body Temperature.

Conclusions

1. All the theories expressed and implied on the structure of rubber as mentioned in the "Discussion of Results" section are strengthened by the results of this investigation.

2. The tensile strength of rubber is directly proportional to the fiber orientation in direction of stress at time of rupture.

3. This investigation indicates that the addition of sulphur to rubber takes place *inter*molecularly.

Supplementary Discussion

The author thinks that he can give some explanation as to why the results of Smith differ so radically from those of Busse. Smith took his tensile strength to be: "The basis for this value is the dimensions of the original sample before cure." In other words Smith took the cross-section of the rubber to be much larger than it actually was since he died out and stretched his samples before cure. Smith vulcanized his samples in boiling water. It is quite possible that the thermal agitation imparted to the molecules by this process destroyed the fiber structure so that no X-ray diagram was obtained from his samples.

Better checking values between different times of cure could be obtained if the sulphur chloride were so arranged that it did not decompose by reason of the gas flowing through it. It is quite possible that some sulphur oxychloride was formed and passed over the rubber with the sulphur chloride. This would naturally act as a diluent and is probably the explanation of the fact that it would appear from Figure 8 that the rubber in the 3-5 cure contains more combined sulphur than does the sample with the 5-5 cure.

Acknowledgment

The author wishes at this time to express his gratitude to Professor E. A. Hauser for his unfailing interest in this work and his guidance. Thanks are also due to Dr. D. S. le Beau for her many valuable suggestions to the writer.

This paper was first submitted as a thesis for the B.S. degree at Massachusetts Institute of Technology, in June, 1940. It has never before appeared in print.

Equipment for Accelerated Light Aging of Rubber and Methods of Evaluation of Ultra-Violet Light and Sunlight[1]—II

T. A. Werkenthin,[2] David Richardson,[3] R. F. Thornley,[4] and R. E. Morris[5]

A NUMBER of photographs are included in order to show the type of apparatus that has been found suitable. In the course of the development of this method, a number of modifications of *procedure* were tried, such as the use of stirring equipment to keep the action of *actinometric* solution of uniform concentration throughout the absorption period. A number of these modifications are indicated in the accompanying photographs and are included solely for the purpose of avoiding duplication of effort because these methods have been tried and found to complicate unnecessarily the equipment, and, in fact, to vitiate some of the desirable points listed above.

Figure 1[6] indicates a type of burette which has been found to be particularly suitable in the titration of the uranyl oxalate solution with potassium permanganate. Figure 2[6] illustrates this type of burette in a dark-room closet used in titrating the actinometer solution. A similar burette is used for the permanganate solution. The equipment which has been found suitable for maintaining the actinometer solution at the desired temperature during titration is shown in Figure 3.[7] Figure 4 shows respectively the rectangular Forbes cell and holder and the round Fisher actinometric cell and holder which contain the sensitive solution. The holders are constructed of aluminum or other suitable lightweight metal. Except for the exposed glass surface the interior of the holder is painted black in order to avoid transmission of light except through the carefully measured surface of the actinometric cell. Figure 5 shows a holder for the Fisher cell mounted in the revolving frame of the light aging unit. Various attempts have been made in order to determine if stirring of the actinometric solution during exposure to ultra-violet light would give more consistent results. An apparatus of this type with an air-driven stirrer is shown in Figure 6 in its unassembled form and in Figure 7 with the various parts assembled. Tests, however, indicated that stirring of the actinometric solution is not necessary when a thin layer of solution is exposed to the light, such as is the case with the round

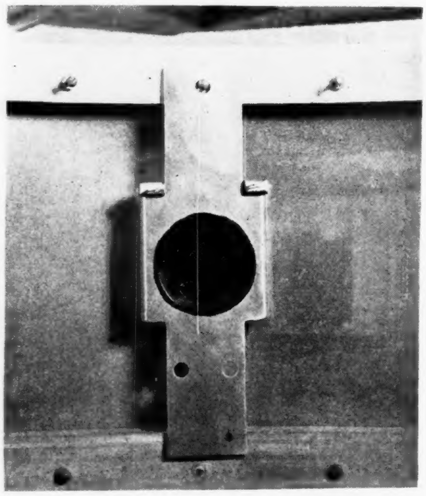
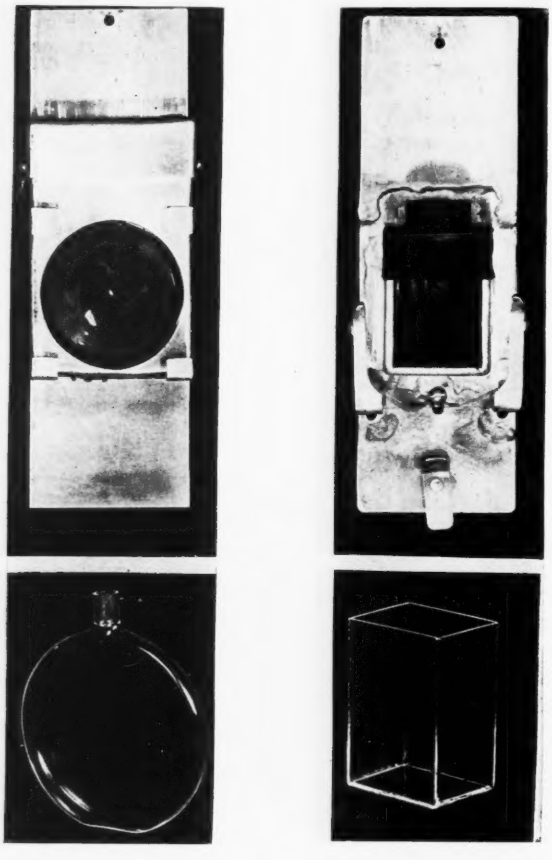


Fig. 5. Circular Quartz Cell in Holder on Revolving Frame of Light Aging Unit



Round or Fisher Actinometric Cell and Holder **Fig. 4.** **Rectangular Forbes Actinometric Cell and Holder**

[1] The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.
[2] Materials engineer, Navy Department, Washington, D. C.
[3] Associate materials engineer, Navy Yard, Philadelphia, Pa.
[4] Assistant engineer, Material Laboratory, Navy Yard, New York, N. Y.
[5] Rubber technologist, Rubber Laboratory, Mare Island Navy Yard, Mare Island, Calif.
[6] See INDIA RUBBER WORLD, Oct. 1, 1941, p. 144.
[7] *Ibid.*, p. 145.

Fisher cell. If it is desired to measure comparative intensity and uniformity of different lights having the same spectral distribution, it has been found satisfactory to use *Fisher* cells. A specimen holder which has been found suitable for exposure is shown in Figure 8. The dimensions for a suitable holder are shown in Figure 9. Comparative tests between Eveready X-1 Unit, an Atlas Weather-Ometer, and Atlas Fade-Ometer were made using the uranyl oxalate actinometer.

The distance between the light source and the specimen or actinometric cell for this equipment is shown in Table 1.

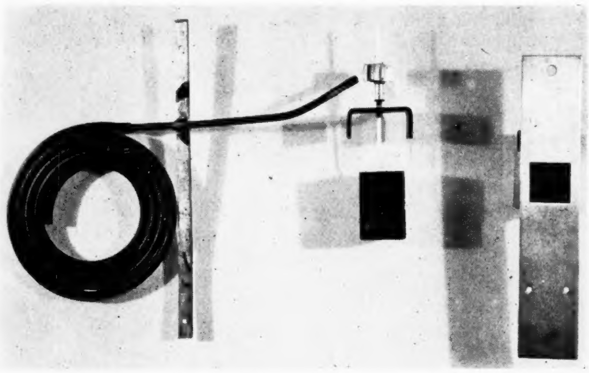


Fig. 6. Rectangular Forbes Quartz Cell with Stirring Device—Not Assembled

TABLE 1

Type of Aging Unit	Eveready X-1	Atlas Weather-Ometer	Atlas Fade-Ometer
Distance from Light Source to Specimen			
Inches	19.000	14.500	10.250
Meters	0.233	0.135	0.068
Actinometer Rate Cell only (Fisher) mg./sq.dm./min.	6.51*	1.88	5.60

*Actinometer rate based on "Sunshine" Carbons, Corex-D panels removed.

An interesting experiment was made in which simultaneous exposure of two Fisher cells, one behind the other, compared to two rectangular Corex-D, or quartz rectangular cells exposed side by side (Tables 2 and 3). It will be noted that the *decomposition* of oxalic acid per square decimeter *taking place* in the second *circular cell,* is equivalent to 1.32 milligrams for industrial "C" carbons (Table 2) and 1.50 milligrams for industrial "U" carbons (Table 3).

TABLE 2. SIMULTANEOUS EXPOSURES, TWO FISHER CELLS EXPOSED ONE BEHIND THE OTHER *vs.* TWO RECTANGULAR COREX CELLS EXPOSED SIDE BY SIDE

(See Figure 10 for Apparatus)

Carbons: Industrial "C" Cells: Fisher C and D, Corex 1c and 2c

Ratios: $R_1 = \frac{C}{D}$ $R_2 = \frac{\text{Average Corex}}{c}$ Exposure: 30 minutes

Exposure Number	Milligrams Oxalic Acid Decomposed per Sq. Dm. per Minute: C	D	1c	2c	Difference Rectangular Cells	R_1	R_2
40	3.21	1.46	5.38	5.63	0.25	2.20	1.71
41	3.31	1.32	5.75	5.75	0.00	2.50	1.74
42	3.21	1.29	6.37	6.62	0.25	2.49	2.02
43	2.90	1.20	4.89	..	..	2.42	1.69
44	2.85	1.08	5.32	5.14	0.18	2.64	1.84
45	3.04	1.24	6.00	5.70	0.30	2.45	1.92
46	3.50	1.36	5.81	..	..	2.57	1.66
47	3.50	1.41	6.25	..	..	2.48	1.78
48	3.11	1.32	5.81	5.87	0.06	2.36	1.88
49	3.35	1.20	..	5.56	..	2.79	1.66
50	3.59	1.41	6.25	6.37	0.12	2.55	1.76
51	3.49	1.46	5.75	5.63	0.12	2.39	1.63
52	3.40	1.44	5.75	5.75	0.00	2.36	1.69
Average of all exposures	3.27	1.32	5.79		0.14	2.48	1.77

TABLE 3. SIMULTANEOUS EXPOSURES, TWO FISHER CELLS AS IN TABLE No. 2 *vs.* TWO RECTANGULAR QUARTZ CELLS

(See Figure 10 for Apparatus)

Carbons: Industrial "U" Cells: Fisher C and D, Quartz 1Q and 2Q

Ratios: $R_1 = \frac{C}{D}$ $R_2 = \frac{\text{Average Quartz}}{c}$ Exposure: 30 Minutes

Exposure Number	Milligrams Oxalic Acid Decomposed per Sq. Dm. per Minute: C	D	1Q	2Q	Difference 1Q — 2Q	R_1	R_2
59	3.52	1.57	..	..	..	2.24	..
60	2.93	1.35	..	..	..	2.17	..
61	2.77	1.25	..	5.87	..	2.22	2.12
62	3.74	1.68	7.04	7.34	0.30	2.23	1.92
62A	3.26	1.37	6.36	6.49	0.13	2.38	1.97
63	3.59	1.58	6.30	6.49	0.19	2.27	1.79
64	3.76	1.77	7.34	7.10	0.24	2.12	1.92
65	3.19	1.37	6.12	..	..	2.33	1.92
66	3.45	1.68	6.98	6.98	0.00	2.05	2.02
67	3.17	1.44	..	..	..	2.20	..
70	..	..	6.61	6.49	0.12	..	..
72	..	..	6.43	6.43	0.00	..	..
73	3.03	1.42	..	..	..	2.13	.
78	3.44	1.47	..	..	..	2.34	..
Average	3.32	1.50	6.65		0.14	2.22	1.95

Absorption experiments made by Forbes and co-workers in 1930 to 1934 indicate that light from 2,060 Angstrom units up to 3,132 Angstrom units is completely

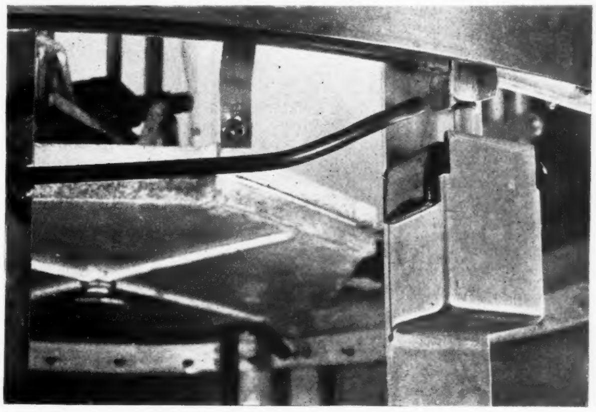


Fig. 7. Rectangular Quartz Cell with Stirring Device in Holder on Revolving Frame of Accelerated Light Aging Unit

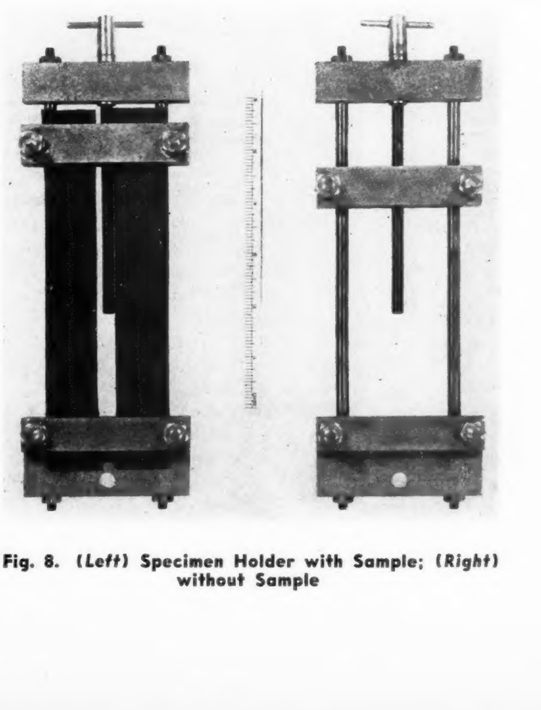


Fig. 8. *(Left)* Specimen Holder with Sample; *(Right)* without Sample

absorbed in a one-centimeter layer of solution so that the light passing through the first Fisher cell probably consisted of wave lengths of greater than 3.132 and less than 3.342 Angstrom units up to 4,700 Angstrom units. It thus appears that the use of one *circular* Fisher cell measures intensity of light within approximately the desired range and as satisfactorily as is obtained in the "difference method" using filters. It is not the purpose of this brief article to set forth detailed data obtained in connection with the uranyl oxalate actinometer method, nor is it possible to show all of the detailed investigations which were made to confirm this.

A comprehensive study of the uranyl oxalate actinometer was made by C. E. Greider and F. T. Bowitch, of the Research Laboratory of National Carbon Co., Inc., in December, 1940. The following is quoted from this paper, by permission of these authors.

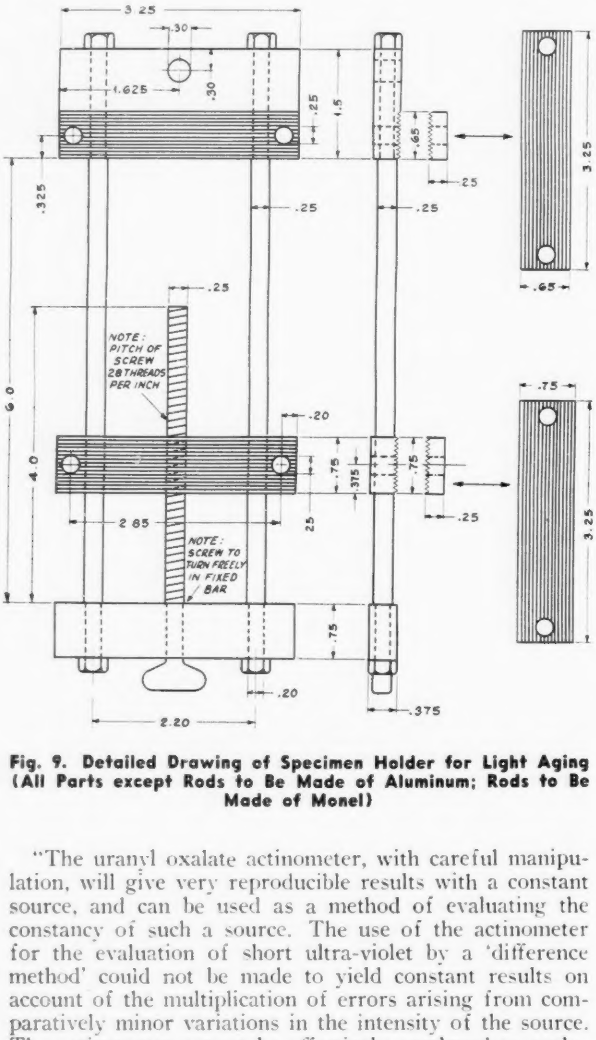


Fig. 9. Detailed Drawing of Specimen Holder for Light Aging (All Parts except Rods to Be Made of Aluminum; Rods to Be Made of Monel)

"The uranyl oxalate actinometer, with careful manipulation, will give very reproducible results with a constant source, and can be used as a method of evaluating the constancy of such a source. The use of the actinometer for the evaluation of short ultra-violet by a 'difference method' could not be made to yield constant results on account of the multiplication of errors arising from comparatively minor variations in the intensity of the source. The actinometer cannot be effectively employed to evaluate the difference between two sources of unlike energy distribution, unless the reaction for which the evaluation is desired has a spectral sensitivity substantially identical of that of the actinometer itself."

This finding confirms the conclusions which the writers had reached concerning this method.

The theory of the uranyl oxalate actinometer has been discussed at length by Dorcas and Forbes (21)[*], by Anderson and Robinson (1) and arrangements by Bacon (4). One of the writers (60) utilized this method in connection with the evaluation of light stability of gasolines in petroleum oils. With the present standardized method it is believed that accurate results may be obtained by using the Fisher circular cell, illustrated in Figure 4, by any laboratory operator who has no special training, provided, of course, that the standardization of solutions is carried out by an analytical chemist.

As far as the writers are aware, evaluation of sunlight aging had been carried out primarily by determining the degree of checking or the change in color and fading (see Figure 11) or various other visible changes which were, to say the least, subject to personal opinions. In order to place the evaluation of sunlight deterioration on a basis which would be more easily comparable and not subject to the personal equation, the suggestion was made to evaluate sunlight deterioration by measuring decrease in tensile strength or lowering of the per cent. elongation just as it is customary in evaluating oxidation and shelf aging. Figure 11 illustrates a special curved aluminum rack which is especially useful for testing matting and flexible decking.

The specimen holder, Figures 8 and 9, was developed for this purpose in order that samples of rubber or synthetic rubber might be exposed to the accelerated ultraviolet light aging in any desired degree of extension.

At first dumbbell specimens were exposed in the sample holder, but it was soon found that the results were not reproducible because of "edge" effect. Entirely satisfactory results were obtained, however, when rubber slabs were exposed which were sufficiently large so that dumbbell specimens could be cut out of them. Deterioration of tensile strength and loss of per cent. elongation were in many cases noticeable long before visual effects, such as cracking or checking, could be detected. Apparently, therefore, deterioration of tensile strength and loss of elongation are forerunners of the usually recognized changes of cracking and checking. It is difficult to draw any generally applicable conclusions as the amount of deterioration will vary with the type of rubber compound or synthetic compound and with the thickness of the slab.

It should not be inferred from the above that the loss of tensile strength and decrease of the per cent. elongation are considered sole criteria of sunlight aging, because checking and cracking will no doubt remain necessary factors in evaluating weather and sunlight resistance. For specification purposes it is particularly desirable, however, to include numerical figures as to permissible loss in tensile strength and decrease in per cent. elongation. The correlation for rubber stocks and for some synthetics between loss in tensile strength as determined by accelerated light aging, on the one hand, and natural sunlight aging on the other hand, appears satisfactory. The loss in tensile strength of some rubber compounds, when exposed to sunlight, is very appreciable. A considerable amount of additional work must be done to determine the advisability of exposure in an elongated condition, compared with exposure of samples at normal elongation. For example, in testing the light resistance of certain rubber caulking compounds it was found that this material showed remarkable resistance both to accelerated aging and to sunlight aging when stretched, compared to high-grade pure rubber compounds. The rubber caulking compound in question was deliberately compounded to have a high compression and to be somewhat thermo-plastic. Exposure of this type of compound in sheet form in the elongated condition indicated comparatively good resistance to sunlight, because sufficient cold flow apparently existed to prevent cracking. What makes an investigation

[*] See bibliography at end of article.

of this sort interesting is that you always run into the unexpected.

Materials, when subjected to either ultra-violet light in the accelerated aging apparatus or to sunlight, may behave in a manner entirely contrary to expectations. Thus a certain synthetic was compounded as a white stock, and light aging tests were conducted which indicated that this white compound was several times as good from the standpoint of light aging as a carbon black compound. So the possibility exists that if this synthetic is produced in sufficiently large quantities, we may have the spectacle of white hose covers and completely white tires.

Another synthetic was found to have especially good resistance to ozone and yet showed a particularly poor resistance to natural sunlight and to ultra-violet light exposure. This ought to be a challenge to the proponents of the theory that light aging is a phenomenon, caused solely by the presence of ozone.

The deterioration caused by ozone is, of course, well established, and it is only meant to infer that light aging is a process not necessarily coupled up with ozone deterioration. The question of the action of ozone on rubber has repeatedly suggested the idea that light aging may be evaluated by measuring the resistance of rubber compounds to oxidation. Unfortunately attempts to obtain correlation between resistance to oxidation, as measured in the oxygen bomb or by the air bomb method, have not been found to be an indication of resistance to sunlight aging so that, if we require compounds which must resist weathering and sunlight, it will be necessary to continue to submit a compound to either natural sunlight aging or an accelerated light aging test such as that described. Work of considerable importance could be done by carrying out so-called "pure research" in determining sensitivity curves or various representative rubber compounds as well as representative compounds of the several available types of synthetics.

This fundamental research could be undertaken to determine the light response curve or spectral sensitivity of various representative types of rubber combinations by exposing such representative rubber in thin sheets to the radiation of measured quantities of essentially monochromatic light and measuring some desirable physical properties, such as deterioration in elongation and/or tensile strength. This work could be done only in a few exceptionally equipped laboratories as it requires the use of an intense light source giving light of the range desired, a quartz monochromater, and thermocouple. The rubber would be exposed to this light for a definite period of time under controlled temperature conditions, and the light intensity would be measured by the thermocouple. By varying the wave length of the light the maximum response to deterioration could be ascertained for each type of compound and entire region of response determined.

Manifestly, it is quite impossible to test each and every composition made commercially since there are some four to five thousand commonly used rubber compounds, not to mention the number of rubber and synthetic rubber compounds which are used infrequently. It is suggested that this type of research work would be admirably suited as Ph.D. theses. How much more benefit they would be to the country as a whole than a thesis on "the use of the semi-colon in the St. James' version of the Bible."

Supposing that this information were available, it would then be possible to select the ultra-violet light range of the aging lamp by the combined use of filters and selection of the proper carbons so that the rubber compound to be examined would quickly be evaluated in terms which may be directly converted to service life in average sunlight conditions.

As the deterioration of rubber and fabric dyes due to sunlight is apparently a photo-chemical reaction, it appeared logical to express this change in chemical terms, such as the decomposition of uranyl oxalate.

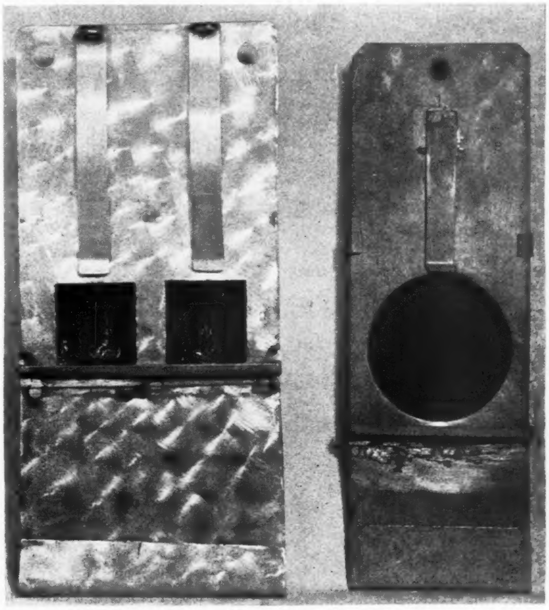


Fig. 10. (*Left*) Dual Holder for Rectangular Cells; (*Right*) Tandem Holder for Circular Cells

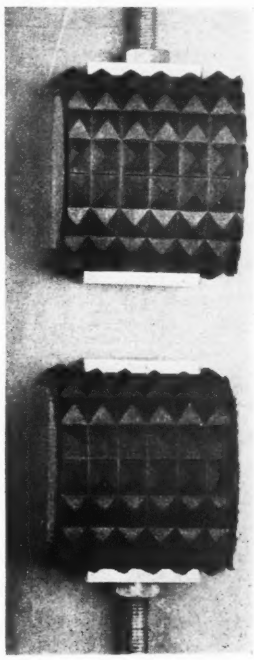


Fig. 11. Curved Aluminum Rack for Rubber Matting Exposure Tests

In unit time, sunlight exposure and accelerated ultra-violet exposure thus produced corresponding chemical changes involving different quantities of chemicals per unit area of exposed surface. In view of the present growing importance of synthetic rubbers, it appears to be not at all unreasonable to expect that synthetic rubber may be synthesized which will be sunlight resistant by the nature of its atomic structural parts instead of as a consequence of physical compounding. The remarkable

resistance of certain synthetics would indicate that this is entirely feasible.

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The Wide Base Rim[1]

As far back as 1915 patents were granted for using a rim as wide as the tire, but this work was too extreme. With each change in thought or trend in tire development, the thinking of the industry on rim width ratio has changed. By rim width ratio we mean the percentage of rim width to inflated tire width. About 1925 when the balloon tire became popular, the rim width ratio was about 50%. In 1933 when the low-pressure balloon tire became popular, the rim width ratio was increased to about 65%, which offset the decreased stability resulting from lower pressure.

By 1940 car speeds had increased so much that the tire industry thought it advisable to investigate again the wider base rims. As a result of this work, The Tire & Rim Association, Inc., approved as experimental practice a program that permitted the use of ½-, one-, or 1½-inch wider rims which increased rim width ratios to as high as 81%.

The advantages to be gained by using the experimental program are: (1) increased tread wear to the extent of about 20% and (2) increased stability and cornering power which provides easier steering control. The disadvantages are: (1) a harder and harsher ride: (2) the possibility of rim damage because the tire does not protect the rim so much as formerly; and slightly increased uneven front wheel wear. Some of the disadvantages, such as increased uneven front wheel wear and harder riding, can very likely be offset to a satisfactory degree by changes in car design with the result that certain car manufacturers might feel that the program is entirely satisfactory and can be used to advantage.

The program does not greatly affect the tire industry because of the present limited use of these wide base rims and the fact that present tires will perform satisfactorily on either standard or wide base rims. In the near future car speeds may be increased to the point where the present tire stability will not be satisfactory. Then this rim width picture will be checked again.

[1] From an article by W. E. Shively, manager, tire design division, Goodyear Tire & Rubber Co., Akron, O., in *Tires*, November, 1941, p. 16.

Distributers' Tire Stocks in the United States, October 1, 1941[1]

THE results of the nineteenth quarterly survey of retail stocks of automobile tires and inner tubes, as of October 1, 1941, are shown below in comparison with summary data for other quarterly surveys. The bases and methods described in earlier reports have been used in calculating stocks held by the following groups of distributers: 1. Individual dealers, including large and small retailers. 2. Distributers through oil-company chains of filling stations. 3. Manufacturer-owned-and-operated stores, mail-order houses, and other important retail chains.

Distributers' Stocks Decline

Total distributers' stocks of motor-vehicle casings on October 1, 1941, estimated at 6,478,000 or a decline of 15.7% from the previous quarter, are low, but not dangerously so. The decrease during the quarter in each of three categories was as follows: dealers, 439,000, oil companies, 524,000, other distributers, 243,000. With the exception of October 1, 1938, total stocks are lower than ever before in the history of this survey, and oil companies' stocks are lower without exception.

DETAILS OF CASING STOCKS DURING RECENT QUARTERS

Year and Month	Thousands of Casings			
	Dealers	Oil Companies	Other	Total
1941				
October 1	2,933	1,403	2,142	6,478
July 1	3,372	1,927	2,385	7,684
April 1	3,367	1,858	2,461	7,686
January 1	3,248	1,772	2,290	7,310
1940				
October 1	3,139	1,790	2,341	7,270
July 1	3,281	1,796	2,982	8,059
April 1	3,312	1,755	2,482	7,549
January 1	2,996	2,000	2,014	7,010
1939				
October 1	3,122	1,487	2,250	6,859
July 1	2,900	1,646	2,356	6,902
April 1	3,018	1,725	2,074	6,817
January 1	2,735	1,838	1,220	6,493
Annual average:				
1938	2,844	1,976	2,031	6,851
1937	3,399	1,874	2,298	7,571
1936	3,500	1,650	2,000	7,150

Net Drop in Inner Tube Stocks

The net drop in total distributers' stocks of inner tubes was 863,000, or 12.3%. Dealers' stocks were off 545,000, and oil companies', 424,000, but other distributers increased their stocks during the quarter by 106,000 tubes. This is the highest figure reported by this group since 1937. Total tube stocks are only slightly lower than on October 1, 1940.

ESTIMATED DISTRIBUTERS' STOCKS OF INNER TUBES

Year and Month	Thousands of Inner Tubes			
	Dealers	Oil Companies	Other	Total
1941				
October 1	2,972	1,158	2,014	6,144
July 1	3,517	1,582	1,908	7,007
April 1	3,948	1,561	1,810	7,319
January 1	3,290	1,541	1,579	6,410

[1] *Industrial Reference Service*, Part 10, No. 36, Nov. 1941, United States Department of Commerce, Washington, D. C.

ESTIMATED DISTRIBUTERS' STOCKS OF INNER TUBES—(*Cont'd*)

Year and Month	Thousands of Inner Tubes			
	Dealers	Oil Companies	Other	Total
1940				
October 1	3,029	1,501	1,754	6,284
July 1	3,486	1,446	1,799	6,731
April 1	3,551	1,487	1,821	6,859
January 1	3,310	1,671	1,532	6,513
1939				
October 1	3,220	1,406	1,793	6,419
July 1	3,206	1,393	1,829	6,428
April 1	3,460	1,626	1,588	6,674
January 1	3,445	1,733	1,599	6,777
Average, 1938	3,565	1,908	1,739	7,212

Dealers' Reported Stocks

Stocks reported on October 1 by 1,154 dealers operating 1,631 outlets are compared below with the reported stocks on July 1, covering 1,672 outlets. Reduced stocks of tires and tubes were reported by each of the three size groups of dealers, but the percentage reduction was greatest for the smaller dealers.

REPORTED STOCKS OF CASINGS AND TUBES

Casings	Dealers	Stores	Casings	Tubes
July 1, 1941				
Under 200	821	921	84,446	97,699
200 to 500	216	344	76,452	79,294
Over 500	117	407	150,675	139,783
Total	1,154	1,672	311,573	316,776
Index	.....	.....	96.3	.....
October 1, 1941				
Under 200	821	904	63,210	82,543
200 to 500	216	307	66,489	66,526
Over 500	117	420	141,476	131,911
Total	1,154	1,631	271,175	280,980
Other October 1	242	282	56,516	50,904
Total October 1	1,396	1,913	327,691	331,884
Index	.....	.....	83.8	84.9

Stocks of Special Dealer Groups

Stocks reported by 74 New York dealers, covering 84 stores, aggregated 14,298 casings and 14,275 tubes, a decided drop from last quarter. A survey of dealers handling three particular makes of tires reveals that, as a whole, they followed the trend of decline prevailing in the dealer group, although stores handling one make tube increased their stocks. The breakdown by size groups, however, shows that, in two cases, one each in the "Under 200" and "200 to 500" casing category, dealers handling a particular make tube increased their stocks. Among dealers having stocks of more than 500 tires, two groups increased their tire stocks, and one increased its tube stocks.

Oil-Company Distributer Stocks

Comparative figures were received from 32 firms in the oil-company distributers' group; some reports covered stocks in central warehouses only; while others also

(*Continued on page 303*)

Further Electron Microscope Studies on Colloidal Carbon and the Role of Surface in Rubber Reenforcement[1]

W. B. Wiegand[2]

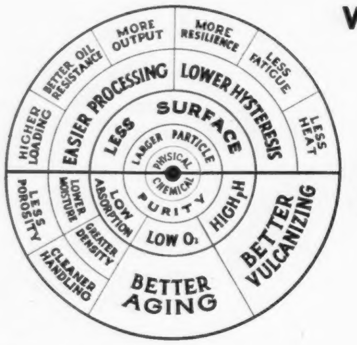


Fig. 1. Advantages of Semi-Reenforcing Carbons in Natural and Synthetic Rubber

Columbian Carbon Co., 1941

PARTICLE SIZE AND SURFACE. Using the method of a previous publication,[3] the following results for colloidal carbons which have been used in rubber were obtained. The values assigned are tentative, and an accuracy better than 20% is expressly disclaimed. Magnifications (final) 50,000 in all cases.

Carbon	Mean Diameter (mμ)	Surface (Acres per Lb.)
Coarse Thermal (Thermax)	274	1.1
Lampblack (Rubber Velvet)	97	2.6
Semi-Reenforcing (Furnex-Gastex)	81.5	3.7
Fine Thermal (P - 33)	74	4.1
Acetylenes (Shawinigan)	43	7.3
Statex (Columbian)	34	8.4
Carbon Black (Micronex)	28	10.6
Color Carbon (Super Spectra)	13	22.2

PARTICLE SHAPE AND DISTRIBUTION. Spherical shape preponderates in all cases. Considerable variations in distributions with tendency toward right-handed skewness. Acetylene black and lampblack pictures show irregular networks of contracting particles, other carbons being particulate and flocculate.

The absence of elongated or acicular habit in the S. R., lampblack, and acetylene carbons necessitates a new theoretical approach to the problem of modulus and hardness. The rubber compounding properties of the carbons are therefore reviewed in some detail, over loading range from 20 to 150% by weight on the rubber.

RUBBER COMPOUNDING STUDIES. *Energy*, Micronex, Statex, and S.R. reach maximum at about 50%; P-33 at higher loading; acetylene and lampblack at much lower loadings.

Tensile Strength. Same general distinction holds. Acetylene in both cases is more extreme than lampblack.

Modulus (L-300). Sharp reversals from energy and tensile as regards order. Acetylene now highest; lampblack second; Micronex, Statex, and S.R. third (as a group); and P-33 much the lowest.

Shore Hardness. Similar to modulus, excepting lampblack and S.R., carbons which are now lower than carbon black, indicating that their stress-strain curves have crossed at the lower elongations.

Rebound Resilience. Carbon black much the lowest; Statex and Acetylene nearly equal; then S.R., lampblack, and P-33 in increasing order.

Raw Plasticity. Inverse order to Shore hardness. Carbons producing softest raw stocks produce softest cured stocks.

Electrical Resistivity. Influence of fineness and purity obscured by other factors. Acetylene much the lowest. Statex next. Lampblack much lower than S.R. carbons although both coarser and less pure. S.R. carbons overtake carbon black at approximately 90% loading; lampblack at 55%. Evidence that lampblack and acetylene black reach lower values than justified either by their particle size or composition.

ADVANTAGES OF SOFT CARBONS. Details of development, manufacture, and application in natural and synthetic rubber. Figure 1 illustrates some general principles involved. Synthetic rubbers, being harder, less resilient and less extensible than natural rubber, are even more dependent than the natural product on soft carbons.

SURFACE CHEMISTRY AND BEHAVIOR IN RUBBER. Analysis of detailed tabular comparison shows that:

(1) pH and vulcanizing behavior can be related to CO_2 content in volatile matter.

(2) Neither total volatile matter nor composition of same correlates with reenforcing properties and distinctions.

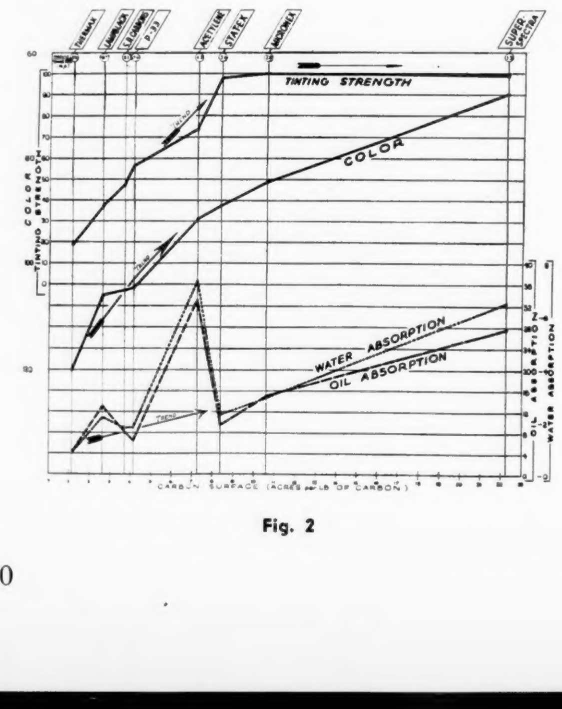


Fig. 2

[1] Abstract of a paper read to the Canadian Chemical Association (Ontario Rubber Division) at Kitchener, Ont., Nov. 14, 1941.
[2] Columbian Carbon Co., 41 E. 42nd St., New York, N. Y.
[3] "The Particle Size and Shape of Colloidal Carbon as Revealed by the Electron Microscope." Vol. II of "Columbian Colloidal Carbons." Columbian Carbon Co., New York, 1940.

(3) Carbons of similar area may show almost identical chemical analysis and yet behave sharply differently in rubber.

These results turned attention back to the carbon itself and its behavior as a colloid.

Colloidal Properties and Surface Area. Detailed tabular comparison with surface values from one acre to 22 acres reveals:

(1) Apparent density decreases with increasing surface, but acetylene black and lampblack are lower and thermal blacks higher than expected.

(2) Sedimentation volume in alcohol and benzene increases, but acetylene and lampblack are much higher than justified by their surface.

(3) Gloss of torn surface in a 50% cured tread stock increases with surface, but lamp and acetylene blacks are *duller* than expected.

(4) The bound rubber value for thermal carbon is lower than expected.

(5) When ground into a Glyptol enamel, acetylene and lampblack show a much duller surface than that of other carbons whether smaller or larger in particle size.

These results suggest significant and persistent differences in interparticle structure and in particle to vehicle attachment.

Color, Strength, and Oil Absorption *vs.* Surface Area. Data are shown in Figure 2 from which it is noted that:

(1) Tinting strength rises sharply from one acre to eight acres, thereafter remaining comparatively constant up to 22 acres.

(2) Color (in mineral oil) rises continuously, although at diminishing rate to the limits of the present series (the good color of lampblack is attributed to its content of many very finely divided particles).

(3) Oil and water absorption values trend generally upward with increasing surface, but subject to violent fluctuations.

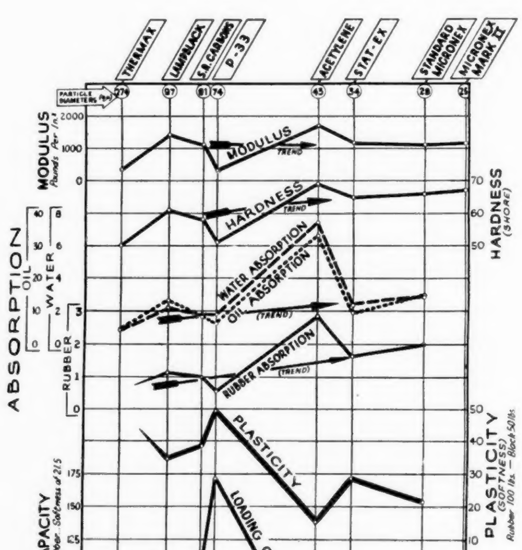
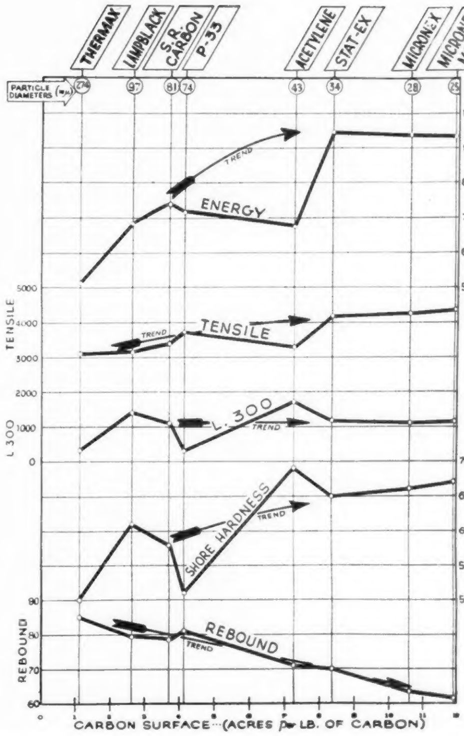


Fig. 3



50 Lbs. Carbon per 100 Lbs. Rubber

Fig. 4

The following anomalies appear:

(4) Acetylene carbon is very high in absorption and low in strength. Lampblack is also high in absorption (without sensible anomaly in strength).

(5) Thermal carbons are low in absorption, but normal in strength.

(6) S.R. carbons, Statex, and the carbon blacks are taken as normal, establishing the trends discussed under (1), (2), and (3) above.

The above, plus the colloidal properties previously discussed, suggested as a working hypothesis that:

(a) Acetylene and lampblacks assume, in liquid vehicles, an altered pigment structure or disposition consisting of carbon to carbon complexes or networks which increase the rigidity and therefore the absorption values, but which, when sufficiently marked, detract from strength (ability to darken a white paste of zinc oxide).

(b) These complexes do not detract from the effect of increasing surface on the absorption of light (normal "color").

(c) Thermal carbons show depressed absorption of vehicles plus entire absence of carbon to carbon structure (normal strength).

With this background it is now possible to approach the role of surface in rubber reenforcement.

Rubber Properties and Surface Area. (a) Oil, water, and rubber absorptions—plasticity, hardness and modulus—Figure 3.

The oil and water absorption of Figure 2 are reproduced. Beneath them is the rubber absorption curve derived from, and the reciprocal of the plasticity values referred to an arbitrary point of 21.5 on the Goodrich plastometer softness scale.

Above them are curves for Shore hardness and for L-300 modulus in a 50% Captax tread mix at best cure. The trends and the anomalies are strikingly similar.

Table 1. Classification of Rubber Carbons

Type	Carbons	Action in Rubber	Rubber Compounding Properties	Tinctorial Properties	Colloidal Properties
I	Carbon Black Statex Semi-Reenforcing Carbon	Form reenforcing "carbon-rubber" complexes.	Normal reenforcement extent of which governed by specific surface of carbon.	Normal trend. Strength rising to maximum. Color rising continuously. Reenforce "active" vehicles in proportion to specific surface.	Density, sedimentation. Volumes, oil and H_2O absorption and bound rubber essentially normal, i.e., follow surface values.
II	Acetylene Black Lampblack	Form both "carbon-rubber" (C-R) and "carbon-carbon" (C-C) complexes.	Engery and tensile low due to C-C complexes interfering with C-R complexes. Raw plasticity and loading capacity low, also. Modulus and hardness high—due to additive effect of C-C and C-R complexes. Electrical anisotropy and conductivity high.	Strength low (acetylene). Color normal. Always form matte or dull surfaces in inks and paints. Surface of torn rubber duller than Types I and III.	Density low. Sedimentation volume high. Liquid absorptions high, due to carbon-carbon network.
III	Fine Thermal Coarse Thermal	Inactive—form no complexes.	Primary action dilution, but tensile strength improved by fine thermal carbon via plastic fiim mechanism.	Strength and color normal for particle size. Inactive to all vehicles.	Density high. Sedimentation volume low. Liquid absorptions low. Bound rubber low carbon surface inactive.

Liquid absorption behavior of carbons ranging from one acre to 12 acres is carried over into raw and even into cured rubber. The network structure or arrangement of the carbon particles survives the shearing forces of the rubber mixing mill (acetylene and lampblacks). Likewise, the inactivity of the thermal carbon particles whether toward the rubber phase or toward each other. S.R. carbons, Statex, and carbon black again constitute the norm.

Broadly, the consistency of raw or cured rubber, as of liquids, is dominated less by carbon surface than by carbon structure.

(b) Energy, tensile and rebound—Figure 4.

Shore hardness and L-300 modulus are repeated from Figure 3 as liaison.

Energy, like tinting strength (Figure 2) is dominated by surface from one acre to eight acres, thereafter flattening. Tensile strength continues a steady rise up to (and beyond) the 12-acre point (cf. Color). In both cases, however, acetylene carbon is far below its surface expectancy, lampblack less so.

Modulus, as already intimated, is so affected by carbon structures (+) and by inertness (—) as to present little discernible response to increasing surface. In Shore hardness, otherwise of similar trend to L-300 modulus, surface reasserts its upward influence.

Rebound resilience alone responds consistently to carbon surface. Apart from faint residues of lampblack and acetylene deficiency and at P-33 extra resiliency, the curve is a straight line function of surface and its extrapolation to the Super Spectra value (22 acres), squares with the facts to within experimental error.

It is noted in this connection that the extent of deformation involved in Healey pendulum testing (c. 20%) is lower than in Shore hardness (c. 50%) and is in fact the lowest point on the stress-strain curve which is evaluated in customary rubber testing.

The influence of internal carbon to carbon structure upon reenforcement appears to be sensitive to the degree of distortion involved. This suggests that a minute study of the whole stress-strain curve (particularly in its lower reaches) may throw light on the type of structure present.

Conclusions. (1) Based on preliminary electron microscope analysis, rubber carbons are assigned tentative surface values, ranging from one to upward of 12 acres per pound.

(2) In all cases particles are of essentially spherical habit.

(3) Indications of chain and network structure have appeared in acetylene and lampblack plates (conclusion not final).

(4) Physical properties of the carbons in rubber are reviewed, and the advantages of "soft" carbons enumerated.

(5) Differences in chemical compositions are found not to square with reenforcing differences in rubber.

(6) When colloidal properties, tinctorial properties, and rubber properties are plotted against acres per pound, it is found, as anticipated, that surface is in general the dominating influence, subject, however, to important and sometimes controlling anomalies.

(7) These anomalies appear to be largely resolved on the assumption that three broad types of carbon behavior exist.

(I) Carbon-rubber complexes (reenforced rubber) are formed. (Examples—S. R. carbons, Statex and carbon blacks).

(II) Carbon-carbon complexes or networks are formed in addition to (I). Examples, acetylene and lampblacks.

(III) Carbons are inert—neither (I) nor (II) occurs. Examples—thermal carbons.

These relations are brought together in Table 1.

Rubber-to-Metal Primer

Vinculux, a clear liquid produced by Protective Coatings, Inc., Detroit, Mich., is said to promote the adhesion of rubber to any metal (new or corroded) to the extent that brass plating is unnecessary. In rubber-to-metal work it is the usual practice to apply a bonding material before applying the rubber. Vinculux, which is applied as a prime coat over the metal, acts as an adhesion catalyst between the bond coat and metal, it is claimed. Rubber-to-metal bonds of 700 pounds per square inch are claimed for the new material, which has a coverage of 500 to 700 square feet per gallon and may be applied by dipping, brushing, or spraying.

When Vinculux is applied to corroded metal, sandblasting is reported to be unnecessary; the material dissolves the rust, after which the metal is washed, and a fresh coat of liquid is applied and dried. In the case of new, clean metal a single coat of Vinculux is required, and washing is unnecessary. It is further claimed that Vinculux will remove all oxidation from the surface of non-ferrous metals to be bonded to rubber.

Vansul Color Chart (Eighth Edition), issued by Vansul, Inc., Englewood, N. J., is an attractively bound loose-leaf folder, comprising nine color cards, each with 10 vulcanized colored rubber samples (colored full strength and tinted) attached, and a performance chart which gives basic information relative to the behavior of the firm's colors in rubber (curing properties, migration, bleeding, fastness to light, aging resistance, etc.)

"Merry-Go-Round"

A Method of Continuous Tire Building . . . . .

T. J. Newton[1]

A. **Tread**
B. **Breaker**
C. **Chafer**
D. **Fourth Ply**
E. **Third Ply**
F. **Second Ply**
G. **First Ply**
H. **Bead and Flipper**
I. **Building Drum**

Fig. 2. Sectional View of a Tire Showing Its Various Constructional Elements and Building Drum

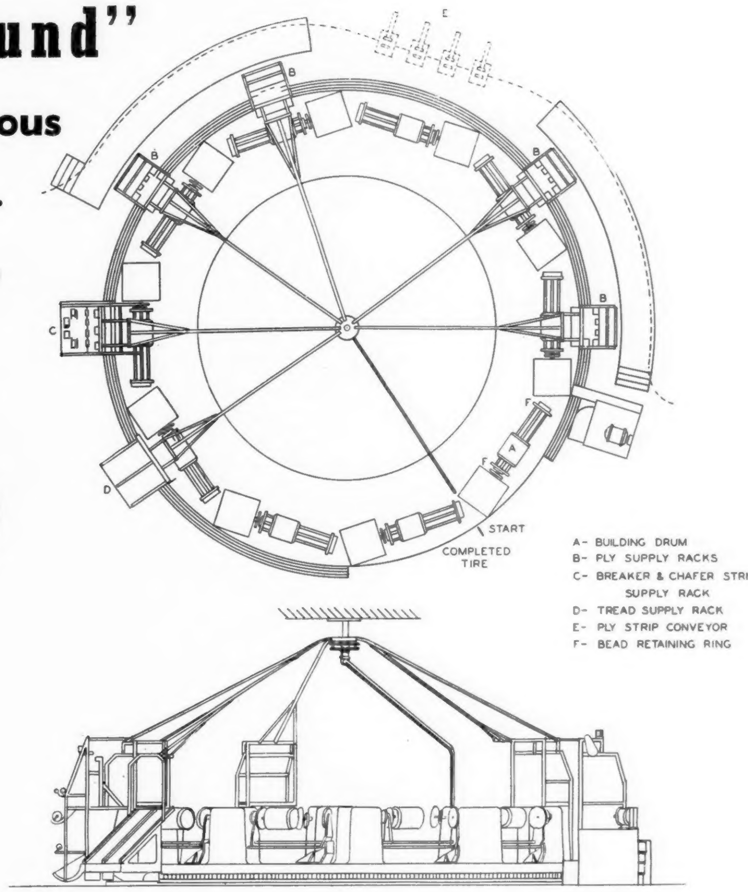


Fig. 1. Diagram of "Merry-Go-Round" Showing *(Above)* Top View and *(Below)* Side View

THE automotive industry has long enjoyed the distinction of being the pioneer in the development of methods associated with low-cost mass production. These refined methods, however, were not available in the early life of the industry. But now, the modern automobile plant is a veritable wonderland of ingenious machines which all have done their share in making the automobile of today a necessity and not a luxury.

With the growth of the auto industry a sister industry, automobile tire manufacturing also has come into prominence. The industry started with solid tires. These were rapidly replaced with pneumatic clincher tires, and in 1898 straight side tires were introduced. Numerous improvements followed. Cord tires replaced square-woven fabric tires in 1914. The flat-band method of tire building was established in 1917, and balloon tires caused a mild revolution in the industry in 1923. These construction improvements were accompanied by other major developments. Organic accelerators were introduced and improved antioxidants were doing their part in making a better, longer-life pneumatic tire. More knowledge was being gained in the use of carbon black with a resultant increase in tread life.

Rubber processing equipment and tire making machinery meanwhile also have undergone numerous improvements. Nevertheless the tire industry had not yet approached the auto industry in low-cost mass production. In 1931, however, United States Rubber Co. introduced and adopted the first continuous tire building machine, called the "Merry-Go-Round", which transforms the building of tires from a highly skilled art to routine assembly-line performance.

Heretofore it had been customary in tire manufacturing to provide individual machines comprising a drum or core on which the different layers of cord, rubber, and other materials were assembled into a partially complete tire by a single workman. This system required each tire builder to possess a complete knowledge of the different steps necessary to assemble each tire. Such a tire building operation necessitated a supply to each operator of all the different sizes, kinds, and shapes of materials going into the tire. Where the machines were widely spaced, this distribution of material was troublesome and expensive.

The continuous tire building machine provides a method wherein a builder performs only a portion of the assembly. He need only be skilled in this one operation. The "Merry-Go-Round" also provides a continuous supply of materials at the proper place and at the exact moment of their assembly into the tire.

The "Merry-Go-Round" consists of a rotating circular platform which is motor driven through a single enclosed chain. On this platform are mounted ten tire building machines, spaced at equal distances on the outer portion of the platform. These tire building machines are substantially the same as the familiar flat drum tire builder.

Adjacent to and around the edge of the circular plat-

[1] Sales engineer, tire engineering and service department, United States Rubber Co., Detroit, Mich.

form is an auxiliary conveyer with supply stations. In building a four-ply tire a supply rack is needed for each ply. Two additional supply racks are used to supply the breaker and the tread respectively. These stations, of the conventional type with festooning devices, provide the building machines with material without interrupting the continuous motion of the platform.

The supply racks consist of a structural framework supported by flanged wheels riding on a single track at the periphery of the rotating platform. The stations are supported at their tops by connections which lead to a central support mounted in the ceiling. The central support also serves as an entrance for air or electrical conductors to the stations. Located at specific positions around the platform, the stations are free to move along with it for a predetermined distance.

When the building drum is in alinement with the supply station, an engaging device couples the station with the building platform. After the building material has been transferred, the rack is disengaged and returns to its original position. This return is actuated by a coil spring and cushioned by a bumper.

The plies, which are carried from the bias cutter to the operator by means of a conveyer, are fed into the supply station after they are first spliced into a continuous length on a splicing table integral with the supply rack. The supply of stock is looped up and down over rollers in the rack so that stock may be fed into the supply unit and withdrawn without either operation affecting the other.

The racks for breaker and chafer strips are similar to the ply racks, but the breaker and the chafing strips are on rolls wound between liners. The chafing strip rolls are positioned on each side of the breaker rolls to be transferred to the building drum in their correct respective positions.

The tread supply rack comprises essentially a structural framework supporting an inclined table positioned in such a manner that the upper portion is relatively close to the building drum. Like the preceding storage devices, the tread rack is supported by a flanged wheel operating on the previously described outer track. The rack has a capacity of two treads; the engaging mechanism is designed so that the tread slab may be drawn from alternate sides to succeeding building drums.

In the operation of the "Merry-Go-Round" the building drums, bias cutter, and supply stations are operated by 14 workmen. Nine men are directly engaged in building the tires. The extra building drum on the platform eliminates any congestion as the operators move from one machine to the next. Another worker operates the bias cutter and supplies the ply racks with material. One operator splices the strips and loads the ply rack for the first and second plies, and another operator handles the supply racks for the third and fourth plies. The breaker and tread racks are operated by the thirteenth operator and the fourteenth is a relief man. One complete revolution of the "Merry-Go-Round" produces ten assembled tires ready for the shaping operation and subsequent vulcanizing.

The operation of the "Merry-Go-Round" is fascinating when watched and followed in each succeeding operation. At the starting point, the No. 1 tire builder places over the collapsed drum the first bead with attached flipper (see *H*, Figure 2) and adjusts it on the bead ring of the building machine. The second bead is then adjusted on the outer retention ring. After expanding the collapsed drum, the builder then applies an adhesive to the drum's surface to assure a bond between the first ply (*G*, Figure 2) and the drum. During this interval the No. 1 building machine, which we will follow in a complete revolution, has moved into the position of the rack which supplies

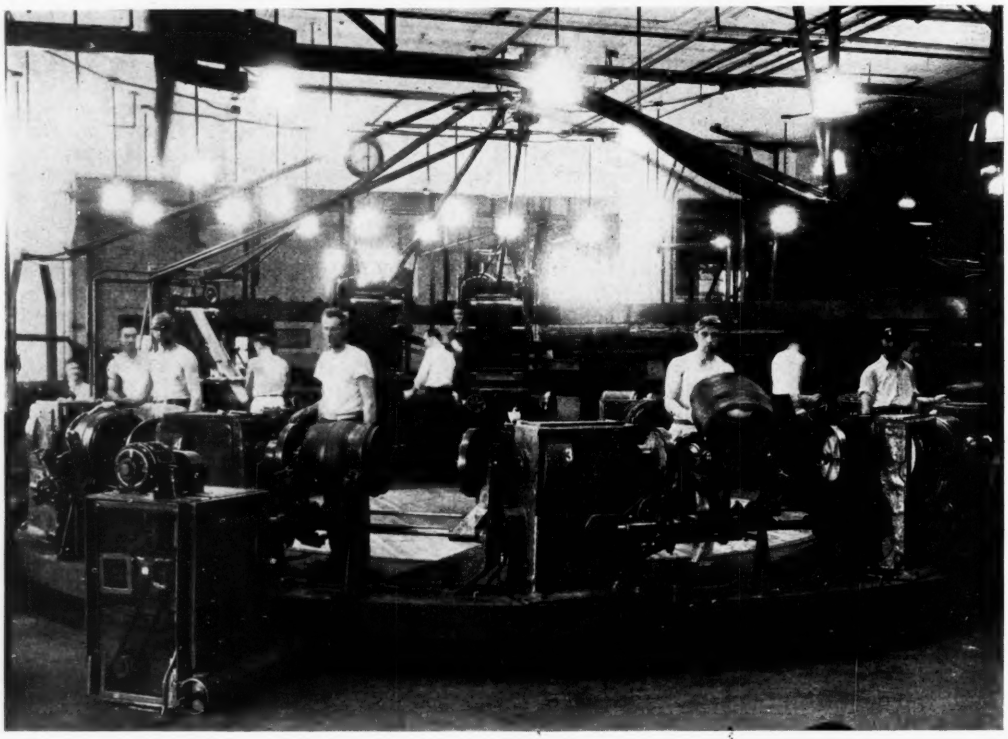


Fig. 3. View of "Merry-Go-Round" Showing in Front the Start and the Finish of the Assembly-Line Operations

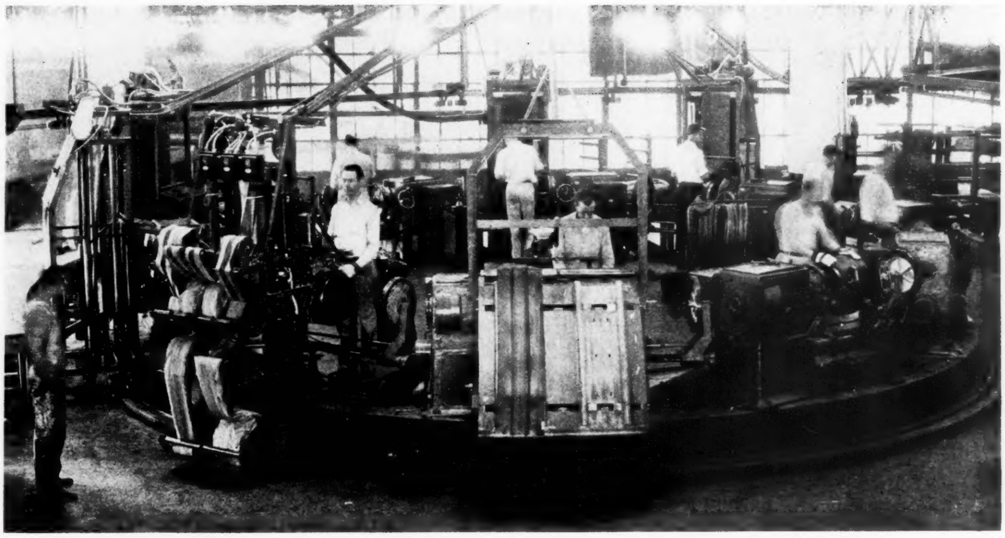


Fig. 4. View of "Merry-Go-Round" Showing in Front Tread Application Zone

the first ply. The engaging mechanism causes this rack to be carried along with the building machine, and during this interval the same operator rotates the drum while placing the first ply. The stock is then severed with a short lap allowed for splicing. This over-lap is lightly stitched to assure adhesion. This completes the operations performed by the first tire builder, who then walks back to the machine next in line and performs the same tasks again.

In the next zone of assembly the "Merry-Go-Round" immediately engages the station furnishing the second ply (*F*, Figure 2), which is laid over the first ply by the No. 2 operator so that the diagonal cords are substantially at right angles to the cords of the preceding ply. The same builder uses the mechanical stitcher to completely stitch down the two plies. After the extending portions of the plies are stitched down over the shoulders of the drum, he then actuates the bead retaining rings to bring the beads within the margin of the first two plies. Completing this operation, he goes back to the succeeding machine to repeat his duties. As the building machine has moved into the next zone, operator No. 3 stitches the flippers on to the top of the second ply. By use of a hand tool the extending portions of the first and second plies are then brought up and around the beads and stitched down firmly.

The building machine has now engaged the third ply (*E*, Figure 2) rack, and this ply is laid over the second one in the manner previously described. Tire builder No. 4, who performs this operation, also repeats it with the fourth ply (*D*, Figure 2) and thus completes the ply laying operations.

The building unit now moves into the next zone of operation where the breaker (*B*, Figure 2) and chafer (*C*, Figure 2) supply rack is engaged. The breaker and two chafer strips are drawn simultaneously from the supply rack by builder No. 5 and laid on top of the fourth ply.

The tread (*A*, Figure 2) supply station now moves along with the building machine. The tread applying zone is manned with three builders all of whom perform the same operations, because the length of this zone is greater than that of the other building zones and it has been found preferable for a single workman to complete all operations within the tread applying zone. Thus operator No. 6, 7, or 8 transfers the tread slab to the partially assembled tire and after joining the ends pats down the tread so that it adheres to the under fabric. He then stitches down the entire assembly with the mechanical stitcher, and next spins the drum, manually stitches the third and fourth plies down and under the bead wires, and finally collapses the building drum from which he loosens the carcass.

In the last zone the final operator, No. 9, removes the tire from the collapsed drum and transfers it to an overhead conveyer leading to the bagging machine for shaping. This operator also helps operator No. 1 prepare the drum for the succeeding cycle.

Certain advantages of the "Merry-Go-Round" are apparent. With each builder performing his work ten times as often as on previous methods, he attains a high proficiency both in quality workmanship and reduction in the time taken to complete his task. The tools required for use on a single machine are distributed over ten machines, reducing the number in use. The "Merry-Go-Round" eliminates all confusion in the supplying of needed materials to the tire builder. By this method one supply station for a certain material handles ten machines, where previously each machine was supplied individually at its stationary location. The full advantage of the "Merry-Go-Round" is achieved with a continuous production of one size of tire, where it is possible to adjust permanently the bias cutter, building drums, tread cutter, and machine speed.

Completely assembled tires come off the "Merry-Go-Round" almost as fast as the operator can remove them. With nine tire builders cooperating in the assembly of each tire, the "Merry-Go-Round" makes it possible for each workman to produce approximately twice as many tires as can be produced under the conventional system whereby one man builds a complete tire.

Our Production Department has enthusiastically received the "Merry-Go-Round." In the Detroit plant of the United States Rubber Co. four such processing units are now in use, and a fifth is under construction. Other plants of the company also utilize this mass-production equipment.

The development of the "Merry-Go-Round" is an outstanding contribution to the tire industry's continued efforts to make a better tire at a lower cost.

EDITORIALS

Fundamental Research—Can We Afford to Neglect It Again?

NO ONE who has a vital interest in the future of the rubber industry can afford to turn a deaf ear to the forcible and sound arguments for a fundamental research program on rubber that have been presented elsewhere in this issue (see pp. 255-58). As Dr. McPherson, the author, points out, similar plans have been proposed in the past, but they all have been allowed to lapse. But because these former proposals have borne no fruit, it does not necessarily follow that a renewed effort in this direction will also result in failure.

The attitude toward research in recent years has changed tremendously—expenditures for industrial research are expanding rapidly. It is not necessary to sell the idea of the value of research to rubber manufacturers. They recognize its worth, and most companies which conduct such programs know fully that their competitive position in the industry would be seriously impaired by a discontinuance of research.

The rubber industry today is confronted with the disturbing effects of a fast changing world. Rubber consumption is being curtailed; materials and equipment are becoming scarce; prices are being controlled; new taxes are being imposed; and in the face of these obstacles, the rubber mills of the country are shifting rapidly into military production. The days of *laissez faire* are gone. We must accept new ideas. It might be well to look back to the days of the last war when the rubber industry was faced with a similar, though not so acute, disturbing situation. Out of that struggle was born in 1919 the Division of Rubber Chemistry, A. C. S., an organization which has contributed immeasurably to the furtherance of the science of rubber and has aided in furnishing the background needed to make rubber one of the most indispensable materials in our national economy. Frankly it is our hope that in this new period of stress, far-sighted leaders in the industry will turn the proposed program of fundamental research into an accomplished fact.

There are many who look to the future post-war period with dismal foreboding. Theirs is an attitude of defeatism. While we entertain no such pessimistic view, we believe that the position of our future rubber industry will be vastly improved by the adoption of this research program *now*. We know of no better antidote to combat the germ of economic defeatism. The program outlined should not interfere with applied research now being carried out in the industry's laboratories. Rather it should lend impetus to such work and provide the groundwork that will lead to new and greater achievements. The program will give new life-blood to the industry—new vigor to stimulate developments in rubber technology.

The need of basic research constantly grows. Besides natural rubber, there are the synthetic rubbers that need investigation if the full extent of their potentialities are to be realized. Although it is a coincidence, another article appearing in this issue, on accelerated light aging of rubber, suggests the possibility of conducting fundamental research on the light sensitivity of various representative rubber and synthetic rubber compounds (see page 266).

Dr. McPherson has pointed out the programs of fundamental research being pursued by the textile and petroleum industries. On October 13 the American Petroleum Institute announced plans for a new materials testing laboratory to carry on work, begun 14 years ago, of isolating and identifying hydrocarbons in petroleum. This announcement stated:

"The work constitutes fundamental research in broadening the ever-increasing scope of petroleum's service to man, and is designed to lay the groundwork for studies and experiments from which may come a growing list of essential products which in the future may be obtained more readily and economically from petroleum than from present sources."

In this article Dr. McPherson has well stated the case for fundamental research. Our words are directed to the men of vision in the industry—to those who are leaders not only in thought, but in action. The rubber industry can afford to support a program of fundamental research. However the question is not "Can we afford it?", but, "Can we afford to ignore it?"

Factory Waste

IN VIEW of the current government rationing program of crude rubber, there is an acute need for each factory to utilize to its best advantage every pound of allotted rubber. One way to work toward this goal is to cut down on factory waste wherever possible. Small pieces of waste rubber that individually appear to be of little consequence, when collected from all sources, may rapidly accumulate to form a sizable amount.

The worker should be made to realize that it is his patriotic duty to conserve every possible ounce of this vital raw material; he should make sure that every pound of rubber is used as it was intended. Wasteful operations should be completely eliminated. The worker has an economic interest at stake in reducing spoilage. Increased waste means less rubber available for production. This may mean less work and less pay.

The Dunlop Tire & Rubber Corp., Buffalo, N. Y., in an effort to reduce factory waste has instituted a program of employe education. Workers are urged to submit suggestions on preventing waste. Another device used in this campaign is a display case in which are exhibited examples of how wastage can be prevented. Other factories can well follow Dunlop's example in promoting such a program.

What the Rubber Chemists Are Doing

Rubber Division, A. C. S., Activities

Akron Group Hears Aviation Expert

THE fall dinner meeting of the Akron Group, Rubber Division, A. C. S., held November 7 at the Akron City Club, attracted 225 who heard T. H. Troller, director of the Daniel Guggenheim Institute, discuss "Aeronautic Research and Military Aviation." He elaborated on the research problems which develop with the application of airplane design to wartime needs. Dr. Troller also dealt with the effect, on both airplane and pilot, of high-altitude speed flying as well as the effects of fighting maneuvers on the design and speed of fighting planes which combat bombers.

W. J. Krantz has been appointed secretary-treasurer of the Group, succeeding D. G. Benson, moved from Akron.

Chicago Group Plans Christmas Frolic

THE annual Christmas Frolic of the Chicago Group, Rubber Division, A. C. S., will be held in the Gold Ballroom of the Congress Hotel on Friday evening, December 19. A committee headed by B. W. Hubbard (Ideal Roller & Mfg.) will engage a large dance orchestra and floor show, attend to the seasonal decorations in the Ballroom, and arrange for gifts to the ladies present. Committee members include: K. R. Elwell (Dryden Rubber); J. P. Highsmith, Jr. (Bibb Mfg.); O. J. Urech (Samuel Bingham's Son Mfg.); R. E. Elliott (Ideal Roller); C. L. Leiter (Inland Rubber); K. Sidell (W. H. Salisbury); S. L. Weller (Du Pont); J. P. Sheridan (New Jersey Zinc); and K. E. LaPoint (Sears Roebuck).

New York Group to Hold Party December 12

AS ANNOUNCED here last month, the New York Group, Rubber Division, A. C. S., will hold its annual Christmas party on December 12, at the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y. Dinner is scheduled for 6.30 p.m., and the program includes election of officers, entertainment, and distribution of gifts. Those planning to attend are urged to purchase their tickets in advance. Attendance will be limited to 350, and no tickets will be sold at the door unless reserved. Tickets for members will be $2.50 and for non-members, $5. Dues for 1941 will not be accepted after December 1. Tickets may be purchased from the Group's secretary-treasurer, B. B. Wilson, c/o INDIA RUBBER WORLD, 420 Lexington Ave., New York, N. Y.

Buffalo Group to Have Party and Elections This Month

THE Christmas meeting of the Buffalo Group, Rubber Division, A. C. S., will take place December 18 at the Hotel Westbrook, Buffalo, N. Y., with dinner scheduled for 6:30 p.m. J. M. Cranz (J. M. Cranz Co.) will again serve as entertainment chairman. A committee to nominate officers and executive committee for 1942 has been appointed by Chairman John S. Plumb, and elections by ballot will be held immediately after dinner.

Tickets may be procured from Mr. Plumb, of U. S. Rubber Reclaiming Co., or the Group Secretary-Treasurer, Burt W. Wetherbee, of Globe Woven Belting Co., both of Buffalo. Price $1.50.

Los Angeles Group Meets

A MEETING of the Los Angeles Group, Rubber Division, A. C. S., at the Mayfair Hotel, Los Angeles, Calif., on November 4, was attended by about 125 members and guests. Carleton Tibbetts, vice president of the Los Angeles Steel Casting Co., who is also chairman of the Los Angeles City and County Division of the Defense Commission and vice president of the Los Angeles Chamber of Commerce, described the defense program of southern California. "The Saga of the Pacific", a motion picture detailing a clipper flight to Asia, was screened by courtesy of Pan American Airways.

The United States Rubber Co., which sponsored the meeting, contributed the table favors and prizes. R. D. Abbot, of the C. P. Hall Co., won the door prize, a rubber raincoat. Special prizes of a U. S. Royal tire and tube went to John Hoerger, of A. Schrader's Sons, and R. E. Pelzel, of the Douglas Aircraft Corp.

A Christmas program will feature the December 2 meeting.

Boston Group Plans Election

THE University Club of Boston, Mass., will be the scene, on December 12 at 6:30 p.m., of the double-feature presentation of the Farrel-Birmingham sound pictures, "Robots and Rubber" and "Rubber at the Rouge", as highlight of the winter meeting of the Boston Group, Rubber Division, A. C. S. Also scheduled is the election of officers for 1942. In keeping with the holiday spirit, prizes will be awarded lucky guests.

Tickets, at $2 for members and $2.25 for non-members, must be reserved before December 10 with Secretary-Treasurer Laurence C. Clarke, c/o Haartz-Mason-Grower Co., Watertown, Mass.

A.C.S. Fall, 1942, Meeting

THE American Chemical Society will hold its meeting for the Fall of 1942 at Buffalo, N. Y., from September 7 to 11 inclusive. Sessions of the Division of Rubber Chemistry are scheduled for September 10 and 11, with headquarters at the Hotel Lafayette.

Plasticizer C-24

PLASTICIZER C-24, a product of Resinous Products & Chemical Co., Inc., is a cyclic ketone, a derivative of isophorone of high molecular weight (348), and is claimed to be compatible with natural rubber, neoprene, chlorinated rubber, and polyisobutylene; however, its compatibility with Perbunan-type synthetic rubber is limited. Although incompatible with polyvinyl chloride in a two component system, the chemical structure of Plasticizer C-24 is said to suggest possible use with vinyl compounds together with other modifiers.

Plasticizer C-24 is reported to be especially useful where properties of permanence, low temperature resistance, and chemical inertness are required in natural and synthetic rubber compositions. It is also suggested for use as a pigment dispersing agent.

A pale yellow liquid somewhat more viscous than water, Plasticizer C-24 has the following properties: boiling point, approximately 410° C. (calculated); specific gravity, 0.875 at 25° C.; refractive index, 1.475 at 25° C.; and solubility in water, less than 0.1%.

Flexalyn as a Plasticizer

FLEXALYN, a pale, extremely tacky, translucent, semi-solid resin of high refractive index, manufactured by the Hercules Powder Co., Inc., is said to be highly compatible with rubber, temporarily increasing its tack and softness when milled in the composition. Known chemically as diethylene glycol diabietate, Flexalyn results from the esterification of the isomeric acids in rosin with diethylene glycol. In addition to its temporary softening action, which is suggested for application in the production of rubber cement, the wetting power of Flexalyn for fillers and pigments in dispersing these ingredients in rubber mix is reported to be satisfactory; however, Flexalyn in its present form is reactive and oxidizing. Completely compatible with latex, Flexalyn is said to increase the mechanical adhesion of this film-forming material when added in amounts of from 20 to 30% by means of either a solution or an emulsion. Flexalyn is also said to be compatible with nitrocellulose, ethyl cellulose, polycyclo rubber, chlorinated rubber, and similar film-forming materials.

Weigand Addresses Ontario Section

THE Ontario Rubber Section of the Canadian Chemical Association met November 14 at the Walper House, Kitchener, Ont., with 70 members and guests present. W. B. Weigand, of the Columbian Carbon Co., spoke on "Further Electron Microscope Studies on Colloidal Carbon and the Role of Surface in Rubber Reenforcements," illustrated by electron miscroscope pictures which revealed the size and structure of colloidal carbons. An abstract of Mr. Weigand's paper appears on page 264.

The speaker, formerly a resident of Kitchener, was introduced by J. C. Howard, of Kaufman Rubber Co., who showed pictures of Mr. Weigand's early surroundings.

W. F. Tuley, sales manager of Naugatuck Chemical Division of the United States Rubber Co., will address the December 11 meeting at the University of Toronto, Toronto, Ont.

Barrett Accelerator and Plasticizer

THE BARRETT CO., 40 Rector St., New York, N. Y., recently added two new products to its line of rubber compounding ingredients. Zipacel, an organic accelerator, is chemically piperidine pentamethylene dithiocarbamate; while Carbonex S Plastic is a new grade of Carbonex S that, it is said, should prove to be an effective neoprene plasticizer.

Montan Wax Substitute

MONTEN wax is a compounding material for the rubber industry which is being offered as a substitute or replacement for montan wax by the Beacon Co., 89 Bickford St., Boston, Mass. The firm also offers five groups of synthetic waxes with highly diversified properties in respect to color, melting point, hardness, etc.

Litho-Kleen Concentrate

WHEN mixed with an equal volume of straight-run gasoline or dry cleaners' naphtha, Litho-Kleen Concentrate, manufactured by The Coleman & Bell Co. for the Lithographic Technical Foundation, Inc., produces Litho-Kleen, claimed to be a satisfactory cleansing solvent and preservative for rubber offset blankets and rubber rollers. Litho-Kleen, which reportedly retards the development of tackiness if used consistently from the time a new blanket is placed on the press, is said to swell the blanket about half as much as gasoline or benzene and to wash it more thoroughly. Less irritant than gasoline or naphtha alone, Litho-Kleen is reportedly easy on the hands of operators.

Ablo Synthetic Rubber Compound

ABLO SYNTHETIC RUBBER COMPOUND, an adhesive claimed to be tough enough to seal glass over an opening in a horizontal position where it may be exposed for years to summer sun and sub-zero weather, is said to be a special non-vulcanizable type of synthetic designed by its manufacturer, American Bar Lock Co., Inc., for use in caulking, sealing, and waterproofing. The compound, which is applied cold with a gun or trowel, is said to contain no resins, asphalt, or putty compounds. It is reportedly capable of adhering to glass as well as to other surfaces including wood, stone, brick, concrete, metal, etc.

Processed Silica Filler

GARTEX XR, a new mineral filler which has been placed on the market, is described as a finely divided, specially treated, and highly uniform silica. The methods of manufacture reportedly give a material free from traces of impurities deleterious to rubber compounds, as well as a product superior in uniformity. Acid resistance of a high order and low solubility, it is claimed, make the XR grade desirable for use as a filler in rubber and resins where these qualities are of considerable importance. Gartex of various grades is being developed by an industrial fellowship at Mellon Institute sustained by Garco Products, Inc., Butler, Pa.

Glyco Items

A SYNTHETIC wax, known as albacer, may be used in place of carnauba wax to polish plastic and hard rubber articles where a non-aqueous solvent is employed, according to the manufacturer, Glyco Products Co., Inc.

This firm also produces S-125, a plasticizer for synthetic rubber which is said to give a flexibility to the cured stock, when used in amounts of from 5% to 10%, equivalent to the flexibility imparted when from 20% to 30% dibutyl phthalate is used. S-125, which does not exude from the stock, is claimed to possess lubricating qualities which facilitate release from the molds.

Scott Builds Laboratory

HENRY L. SCOTT CO., Providence, R. I., announces the completion of its new development laboratory, designed for building special testing machines and to aid in developing new test methods for industry. The facilities of the new unit include the latest in machine shop equipment, adapted to meet any special requirements imposed by new designs or new materials. The laboratory is housed in a building apart from the main factory.

Sodium Silicate in Cements[1]

SODIUM silicates are added to solvent-type rubber cements when a stiffer material than the cement itself is wanted and also when it is desired to increase the adhesion of the cement to certain types of materials, such as glass. As the ordinary rubber solvents do not mix with aqueous solutions but form emulsions, dry silicates are added to the cements. Miscible with latex cements, silicates, when added, result in fireproof products of good aging qualities. In addition the strength, adhesion, and stiffness of latex cements are increased by silicates. Fillers, such as clays, whiting, and talc, are usually added to decrease costs and to improve wearing qualities where abrasion is encountered.

[1] Abstracted from "Rubber Cements", pp. 35-36, "Silicate of Soda Manual", issued by the Philadelphia Quartz Co.

Strangl-Hold Latex Adhesive

STRANGL-HOLD, a latex-containing adhesive with a specific gravity of 1.43, possesses high tensile strength and is capable of producing a high degree of adhesion when joining wood, metal, glass, rubber, paper, leather, etc., according to its manufacturer, Colonial Alloys Co. It is further said that the cement is water-, sun-, and weather-proof; resistant to many corrosives; a good dielectric; unaffected by sudden temperature changes; and non-inflammable. The adhesive does not require vulcanizing and is applied cold by dip, brush, or trowel, drying by air to a black color. Besides its use as an adhesive, suggested applications for Strangl-Hold include the coating of objects subject to ice formations, applying as a base coat for paint, especially under corrosive conditions, quick application of linings to tanks, insulating, cushioning, and sound deadening.

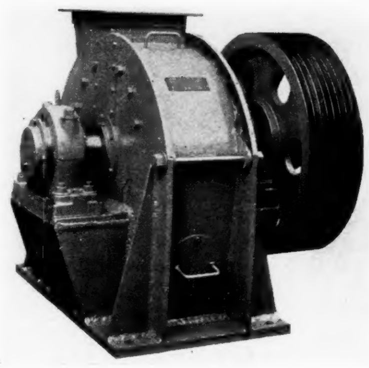
Halloid for Rubber Latex

HALLOID, an inorganic colloidal suspension of the aluminum-silicate group, is produced from a new mineral, an oil impregnated Halloysite, which, when chemically treated (U. S. Patent No. 2,183,086), breaks down into a colloidal dispersion. The material, produced by Kraus Ceramic Products Co., is said to increase the adhesiveness of silicate of soda, glue, casein, latex, etc., when only minute quantities are used.

Prepared in a semi-liquid condition, Halloid contains 52.34% silicon dioxide, 31% aluminum oxide, small amounts of ferric oxide, titanium dioxide, calcium oxide, phosphorous pentaoxide, potassium oxide, magnesium oxide, sodium oxide, and sulphur tri-oxide.

The high thixotropic properties of Halloid is claimed to prevent latex from "bridging" any small holes in surfaces to be cemented. It is also reported to add tackiness and increase the spread of the rubber.

New Machines and Appliances



Heavy Duty Knife Cutter

Scrap Rubber Cutter

DESIGNED specifically for the preliminary reduction of scrap rubber, plastics, and similar materials, the Type 1680 heavy-duty knife cutter has five $\frac{3}{4}$-inch thick fly knives mounted on a 10-inch wide steel rotor and three one-inch thick stationary knives. A section of $\frac{3}{8}$-inch thick steel plate perforated screen is located next to each stationary knife to permit the immediate escape of material which has been reduced to proper size.

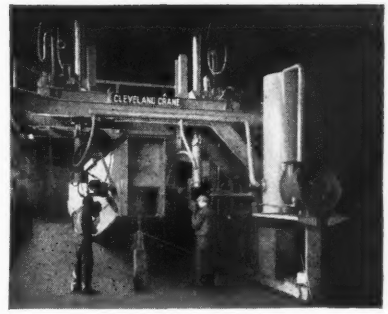
According to the manufacturer, a capacity of from 800 to 1,000 pounds per hour was obtained when, in a recent installation, one of these machines was used for cutting running board scrap and strips of vulcanized rubber (three to eight inches long) through a $\frac{7}{16}$-inch screen. For this capacity an average of 25 h.p. was required. Sprout, Waldron & Co., Inc.

Large-Capacity Extruders

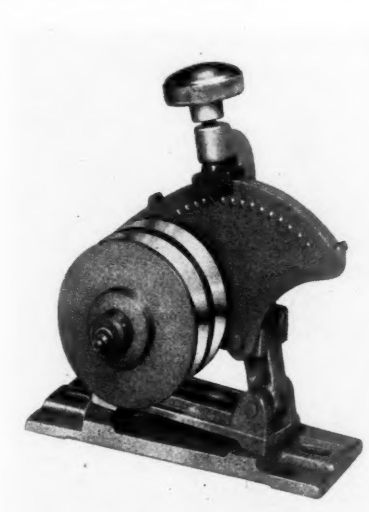
EQUIPPED with plasticizing cylinders from $3\frac{1}{2}$ to 12 inches in diameter and with hard corrosion-resistant linings, new large-capacity extruding machines for thermoplastic compounds have been developed particularly for the production of aircraft and Navy wire and cable. The new units are driven through an enclosed transmission with all gearing straddle mounted between heavy-duty roller bearings. Completely jacketed for high temperature operation, the cylinders are equipped with baffles said to provide progressive heating of the thermoplastic material as it passes through the processing chamber. The periphery of stock screws are reportedly protected against wear by the application of a new hard surfacing alloy which will not be adversely affected by wide variations in temperature. Improved axial-type extruding heads are said to be suitable for tubes or straight extruding of various commercial shapes. A choice of screwed, bolted, or hinged cross-feed head constructions are used for insulating service, with adequate provisions for cleaning, adjusting and maintaining the precision settings required for these operations. The machines are automatically lubricated. National-Erie Corp., Erie, Pa.

Traveling Batch Scale Car for Compounding Materials

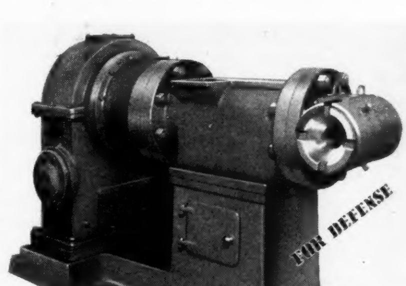
A TRAVELING batch scale car, developed especially for application in the rubber industry, is said to make possible the gathering of the exact amounts of compounding materials that go to make up a batch. The unit consists of a motor-driven car, controlled by an operator who rides on platform space provided to the left of the bucket. The platform is suspended from double overhead rails which makes it possible to straddle overhead bins so that their discharge chutes may be brought close to the car bucket. The scale on the car weighs the ingredients as they are dumped in, and after the batch is completed, the bucket is emptied by tilting through the use of a crank wheel. A variable speed drum controller permits the car to be traveled at any speed up to 300 feet per minute. Cleveland Tramrail Division of The Cleveland Crane & Engineering Co.



One-Half Ton Batch Scale Car



CUB Variable Speed Transmission



Continuous Extruding Machine

Variable V-Belt Speed Control

ESPECIALLY designed for "A" section V-belt applications and for speed ranges up to 3.3-1, the JFS-CUB V-belt variable speed transmission, which uses smooth sided pulleys rather than the interlocking type, may reportedly be mounted in any position without lowering efficiency or throwing belts out of alinement because of a patented positive belt alinement feature. Both pulleys are on one side of the pivotal mechanism permitting the motor pulley and the driven pulley to be almost directly in line with each other. The construction is of machined and balanced cast iron, and the pulleys rotate on special bronze bearings which are under forced lubrication. Easy installation of belts is said to be permitted by the free-end pulley spindle. Standard Transmission Equipment Co.

Cotton Test Service

TO INCREASE effectiveness of the raw material a new cotton testing service to determine physical properties is offered cotton producers and manufacturers by the University of Tennessee Fiber Research Laboratory which has developed a uniform method of scientific measurements. The "Fibrograph" for measuring average length and the "Arealometer" for measuring fineness were invented by K. L. Hertel and R. R. Sullivan, University physicists. The "Pressley" instrument devised by E. H. Pressley, Arizona University professor, tests fiber strength. The new laboratory is equipped to handle 125 samples daily. Information may be obtained from K. L. Hertel, University of Tennessee, Knoxville, Tenn.

New Goods and Specialties

Constructed of latex sponge rubber, this cushioned parachute seat for military aviators features a pressure regulating valve which permits the wearer to adjust the pressure within the seat. This is said to be important in high altitude flying because of reduced air pressure found in the stratosphere. The B. F. Goodrich Co., Akron, O.

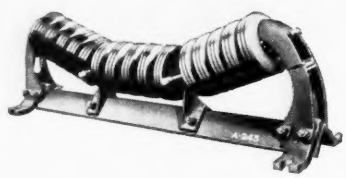
Neoprene Impregnated Tape

THE gasketing of riveted seams in marine construction is reportedly speeded up by the use of a new neoprene tape, known as P. A. W. Sealing Tape. Of cotton fabric, the tape is double faced with a neoprene compound with a layer of dry cement on each surface. Said to be applicable for watertight seams between similar or dissimilar metals, the tape is applied to a metal surface by first moistening one side with kerosene, benzine, or other light oil and then pressing into place. To complete the joint the outer surface of the tape is moistened; the second metal member is placed in position; and the joint is permanently fastened by clamping, drilling, and riveting. The tape, resistant to sea water, gasoline, oil, etc., is made in thicknesses of 17/000- and 50,000-inch. "Fabrikoid" Division, E. I. du Pont de Nemours & Co., Inc., Fairfield, Conn.

Deluxe Tire Has New Tread Design

THE new Deluxe, link grip, non-skid automobile tire is said to differ from similar appearing tread designs in that it is not a rib tread, but has small notches in the two outside grooves which make them flexible so the grooves close up, enabling the small notches to grip the road. It is claimed that this design, based on a wide flat tread, is able to be skid-resistant in all directions, on either wet or on dry pavements, because thousands of straight edges grip the highway. Manufactured in a range of sizes, from 5.50-16 to 7.50-16, in both four- and six-ply construction (except the final size of the series which is available only in six plies), the new tire employs low-stretch Supertwist cord in each tire ply. The Goodyear Tire & Rubber Co.

M. S. A. Ear Defenders



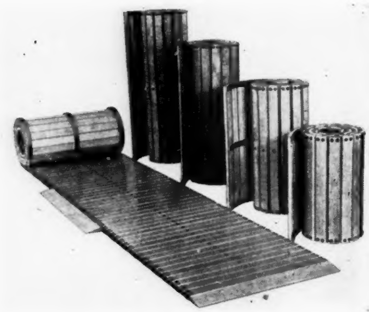
Pneumatic Impact Carrier

Hardwood Flooring Mounted on Rubber Strips

SLAT-RACK Matting is a walkway made of oil-treated hardwood slats mounted on rubber strip supports with integral studs locked to the wood by metal clips. This structure is said to assure security underfoot where slippery conditions prevail because the rubber supports, which cushion the wood, always follow the floor contours and do not creep when walked upon.

Tapered end and side boards to prevent tripping can be furnished. The end toe board is fastened to the end of the strip, becoming part of the unit; while the side toe board is a separate unit held in place by a rust resistant angle plate fastened to the wood and engaged to the rubber so that the board is reportedly held in the proper position

Deluxe Passenger Tire



Slat-Rack Matting

at all times. The flooring is made in several widths. American Mat Corp.

Ear Defenders Reduce Sound

THE M. S. A. Ear Defender is a tapered tube of molded soft rubber, with two air-separated sound barriers, an outer one of metal and an inner one of soft rubber. Sounds heard during noisy operations which tend to induce fatigue, irritability, and nervousness in workers are lessened by the use of the new devices which are said to reduce loud noises by 35-45 decibels or to about 1/10 their former loudness. However, the design is such that warning signals and conversation can easily be heard. Because of their tapered construction, the Ear Defenders are easily inserted and removed. Dr. Vern O. Knudsen, professor of physics at the University of California, and Dr. Carey P. McCord, medical director of the Industrial Health Conservancy Laboratories, designed the Ear Defenders. Mine Safety Appliances Co.

Conveyer Carriers Feature Pneumatic Rollers

THE Style No. 711 Pneumatic Impact Carriers, which feature rollers comprising a series of pneumatic rubber wheels, six inches in diameter and suggestive of miniature automobile tires, are said to be especially designed for use under loading spouts and in belt feeders where the impact of heavy bulk loads subject both conveyer belt and carrier to abnormal strains and wear. The roller units, which are mounted on a steel hub in which bearings and shaft are housed, have thick, wear-resisting treads and, after inflation, are permanently sealed to prevent loss of air. Stephens-Adamson Mfg. Co.

A NEW MINE TELEPHONE CABLE IS SAID to have the mechanical and electrical strength of large cables, but has a diameter of slightly over ¼-inch. This twisted pair, No. 14 Awg solid cable uses Versatol insulation for heat and moisture resistance and a tellurium-compounded rubber jacket for protection against mine waters and soil acids. General Electric Co.

UNITED STATES

Raw Materials Plants for Synthetic Rubber

Federal Loan Administrator Jesse Jones on November 12 announced that Defense Plant Corp., R.F.C. subsidiary, at the request of the Rubber Reserve Co. authorized execution of lease agreements for construction and equipment of plants to manufacture raw materials necessary for the production of synthetic rubber. In each case the Defense Plant Corp. will retain title to the facilities. The agreement with Carbide & Carbon Chemicals Corp., Charleston, W. Va., calls for a plant there to cost about $3,500,000 to make butadiene. The lease with the Monsanto Chemical Co., St. Louis, Mo., provides for a plant in or near Galveston Co., Tex., at a cost of approximately $2,200,000, to be used in the manufacture of chemical products necessary for synthetic rubber.[1]

For Other Defense Needs

The War Department recently reported that it had agreed to make partial reimbursement to the Defense Plant Corp. on eight agreements of lease made by that corporation with industries engaged in defense work. Included in these agreements, which have been approved by the OPM, is one with the Goodyear Aircraft Corp., Akron, O., for establishment of plant and equipment valued at $4,343,671 for the manufacture of outer wings and control surfaces.

Mr. Jones on November 17, 1941, announced that Defense Plant Corp. at the request of the OPM, has authorized the execution of a lease agreement with American Zinc Co. of Illinois, East St. Louis, Ill., to provide for facilities there costing about $4,000,000 to be used in the manufacture of slab zinc. The proposed facilities will have an estimated annual capacity of 17,000 tons of electrolytic slab zinc and 7,200 tons of retort slab zinc. Title will remain in the Defense Plant Corp.

The War Department on November 22 announced the award of a contract, approved by the OPM, relating to a recently announced plant for the Chemical Warfare Service. In connection with the announcement of selection of a site for a plant to manufacture protective chemicals adjacent to the Monsanto factory at Monsanto, Ill., contract has been awarded to the Monsanto Chemical Co. for architectural-engineering services and construction of the new plant, which will cost about $310,200 including installation of equipment and be operated by the Monsanto company.

[1] In his report to the President and Congress on September 13, Mr. Jones mentioned a plant for Monsanto for the manufacture of styrene. EDITOR'S NOTE.

The Wide Base Rim on 1942 Automobiles

On 1942 models two automobile manufacturers are using full wide base rims (an inch wider than usual); while seven are using rims somewhat wider than previous standard practice. Rims are a full inch wider than heretofore on the Buick Extra Special and Super models, and one-half inch wider on the Buick Century, Roadmaster, and Limited models. The Studebaker President 8 also has rims a full inch wider. Cars using rims slightly wider than standard practice on their 1942 models are Cadillac, Hudson, Mercury, Nash, Oldsmobile, Packard, and Pontiac.

Tires magazine has presented a detailed discussion of wide base rims in its October and November, 1941, issues, and a brief review taken from that journal is presented on page 270.

St. Lawrence Seaway May Lower Rubber Freight Costs

Freight costs savings totaling from 28¢ to 33¢ per 100 pounds of crude rubber shipped from the Far East to Akron, O., may be realized by receiving the shipments via the proposed St. Lawrence Seaway and Cleveland, O., according to estimates in "The St. Lawrence Survey, Part III", issued by the United States Department of Commerce, Washington, D. C., on October 7. The freight savings on shipments to Dayton, O., and Jeannette, Pa., would be 22¢ and 13¢ per 100 pounds, respectively, it was stated further. The average annual consumption of crude rubber during the 1928-1937 period in the area which could be served by the Seaway is placed at 302,464 long tons, and, since an estimated 63.4% of this amount is consumed in Ohio, the probable annual freight savings (to Akron) would be $1,312,500.

Most crude rubber used in the Great Lakes area moves from Atlantic ports by rail, principally from New York. Although cheaper differential rates are available, they are apparently not economical enough to attract any substantial volume of trade.

The United States Navy reported that the German freighter disguised as an American vessel, which was captured in Atlantic equatorial waters November 6 en route from Yokohama, Japan, to Bordeaux, France, included among its cargo 3,000 tons of baled raw rubber and "many United States-made automobile tires with inner tubes."

CALENDAR

Dec. 1-5.	A.S.M.E. National Meeting. Hotel Astor, New York, N. Y.
Dec. 1-6.	18th Exposition of Chemical Industries. Grand Central Palace, New York, N. Y.
Dec. 2.	Los Angeles Rubber Group. Mayfair Hotel.
Dec. 3.	Technical Committee A, A.S.T.M. Book-Cadillac Hotel, Detroit, Mich.
Dec. 11.	Ontario Rubber Section. University of Toronto.
Dec. 12.	Boston Rubber Group. University Club.
Dec. 12.	New York Group. Christmas Party. Building Employers' Trade Assn. Clubrooms.
Dec. 18.	Buffalo Rubber Group. Christmas Party. Hotel Westbrook.
Dec. 19.	Chicago Rubber Group. Dinner-Dance and Christmas Card Party. Congress Hotel.
Dec. 29-30.	A. C. S. Division of Industrial and Engineering Chemistry. Eighth Annual Symposium. Cleveland, O.
Dec. 29-31.	A. C. S. Division of Organic Chemistry. Ninth National Organic Chemistry Symposium. Ann Arbor, Mich.
Jan. 9.	Perkin Medal Award. New York, N. Y.
Jan. 12-16.	S.A.E. Annual Meeting and Engineering Display. Book Cadillac Hotel. Detroit, Mich.
Feb. 5.	Chicago Rubber Group.
Mar. 2-5.	A.S.T.M. Committee Week and Spring Meeting. Cleveland, O.
Mar. 6.	Nichols Medal Award. New York, N. Y.

Bicycle Demand High[1]

Bicycles, because of the gasoline shortage in the East and the curtailed production of automobiles, are enjoying a record-breaking demand. Production in the five years 1936-40 was three times as great as in the five years 1931-35. Production in 1939 was 1,252,886 bicycles, value $22,466,550, against 1,130,736, value $22,223,431, in 1937. The previous banner year was 1899, when 1,182,691 units were produced at a value of $23,656,487. The low was in 1921: 216,464 bicycles, values $6,218,394. Output for 1940 is set at 1,325,000 bicycles, and output can probably be raised to 2,000,000 without the need of any major additions to present plants in the form of hard-to-get machine tools.

The industry is in a favorable position regarding raw materials. Despite rubber consumption curtailment, little difficulty is expected in securing the small quantities of rubber for making ordinary bicycle tires, for reclaimed rubber is used extensively in their manufacture. White sidewall tires are being eliminated in a simplification program adopted by the industry at the request of the OPM.

At present 10,000,000 bicycles are estimated to be in use in the United States, a ratio of about one to each three automobiles.

[1] "Bicycle Staging Unprecedented Come-Back." Donald S. Parris, *Domestic Commerce*, Oct. 9, 1941, pp. 12-14.

Supply Contracts Awarded

The War Department, Washington, D. C., recently awarded supply contracts as follows: *aniline oil,* American Cyanamid Co., \$538,000; *bags, pliofilm,* Shellmar Products Co., \$43,647.50; *bags, water,* Hodgman Rubber Co., \$53,500, Marathon Rubber Products Co., \$141,570, United States Rubber Co., \$138,710; *batteries,* Electric Storage Battery Co., \$715,778.79; *bearings,* Timken Roller Bearing Co., \$4,570.32; *belts, ammunition,* Russell Mfg. Co., \$282,600; *belts, drive,* Gates Rubber Co., \$2,360.34; *brushes, shaving,* Rubberset Co., \$55,184; *cable,* Anaconda Wire & Cable Co., \$6,287.61, Belden Mfg. Co., \$3,300, Circle Wire & Cable Corp., \$4,420.40, Crescent Insulated Wire & Cable Co., \$1,257.48, General Cable Corp., \$98,348, Okonite Co., \$115,045, Simplex Wire & Cable Co. \$2,225.16; *cable and reels,* General Cable, \$7,671, U. S. Rubber, \$342,385; *canister and carrier assemblies,* Firestone Rubber & Latex Products Co., \$423,355; *canisters,* Goodyear Tire & Rubber Co., \$32,634; *casing, landing wheel,* Firestone Tire & Rubber Co., \$213,154.24, B. F. Goodrich Co., \$231,200.84, Goodyear Tire, \$213,099.20; *chemicals,* E. I. du Pont de Nemours & Co., Inc., \$429,021.63; *cloth, cotton,* Turner Halsey Co., \$159,425; *coats,* Archer Rubber Co., \$13,393.24, Los Angeles Rubber & Asbestos Works, \$522, U. S. Rubber, \$927.50; *combs,* Bolta Comb Co., Inc., \$17,200, Seamless Rubber Co., \$5,690; *cord,* Belden \$1,044.60, Rome Cable Corp., \$7,179, Simplex, \$6,380, U. S. Rubber, \$5,340; *duck,* Mt. Vernon-Woodberry Mills, Inc., \$117,475; *faceblanks,* Acushnet Process Co., \$397,962.50, Firestone Tire, \$178,250, Goodyear Tire, \$239,250; *firing devices,* Auburn Rubber Corp., \$600; *footwear,* Beebe Co.,\$218.55, Cambridge Rubber Co., \$58,914.52, Converse Rubber Co., \$95,580, Endicott Johnson Corp., \$55,602.32, Goodyear Footwear Corp., \$78,316.60, Goodyear Rubber Co., \$92,681.16, Hood Rubber Co., Inc., \$336,800, LaCrosse Rubber Mills Co., \$90,030, Los Angeles Rubber & Asbestos Co., \$963.20, Sears Roebuck & Co.. \$1,892.50, Servus Rubber Co., \$109,655, Tyer Rubber Co., \$85,829.66, U. S. Rubber, \$853,043.30, Victor Belting & Rubber Co., \$1,200.20, Wilson Sporting Goods Co., \$625; *gas masks,* Goodyear Tire, \$339,187.65; *gaskets and washers,* Victor Mfg. & Gasket Co., \$2,402.42; *gasoline, oil, etc.,* Socony-Vacuum Oil Co., Inc., \$58,165.72; *gloves,* Beebe, \$785, Hirsch-Weis Mfg. Co., \$191.75; *grinding wheels,* Bay State Abrasive Products Co., \$3,801.50, Carborundum Co., \$1,640.66, Norton Co., \$8,461; *hammers,* Barco Mfg. Co., \$6,861.60; *hats,* U. S. Rubber, \$304.50; *hose,* Boston Woven Hose & Rubber Co., \$10,409.10, Goodrich, \$104,466.41, U. S. Rubber, \$9,861.48; *hosetubes,* Continental Rubber Works, \$70,950, Firestone Tire, \$49,500, Goodyear Tire, \$170,940, U. S. Rubber, \$107,250, *hosetubes and faceblanks,* Acushnet, \$146,470; *indicators, mixture,* Cambridge Instrument Co., \$110,200; *marking machines, insulating rubbers and belts,* American Machine & Metals, Inc., \$2,067; *overalls,* Victor Belting, \$196; *pads, back rest and bodies, back rest,* Ohio Rubber Co., \$6,283.48; *parts, component, for tool kits,* Central Rubber & Supply Co., \$716.80; *polishers, rubber cup,* Young Dental Mfg. Co., \$3,130; *pumps and suction hose,* E. B. Kelley Co., Inc., \$8,480; *rafts,* Goodyear Tire, \$1,491,840; *raincoats,* National Supply Co., \$297, U. S. Rubber, \$3,401.70; *receptacles, weights, cups, and platters,* Exact Weight Scale Co., \$15,452.80; *shell ramming and fuse setting device,* United Shoe Machinery Corp., \$50,000; *supports, and thermometers,* Taylor Instrument Cos., \$338; *tanks, and panels, construction,* U. S. Rubber, \$60,440; *tape, adhesive,* Bauer & Black, \$4,575; *tires and tubes,* Dunlop Tire & Rubber Co., \$84,375, Falls Rubber Co., \$103,814.64, Firestone Tire, \$228,253.55, Goodrich, \$7,394.54, Lee Tire & Rubber Co., of N. Y., \$1,094.10, Seiberling Rubber Co., \$35,173.44; *trousers,* Black Mfg. Co., \$890.35, C. J. Hendry Co., \$234.11, Hirsch-Weis, \$467.25, Tacoma Marine Supply Co., \$429.50, U. S. Rubber, \$1,145.85; *vests, life preserver,* Goodyear Tire, \$357,000; *vulcanizing kits,* Shaler Co., \$18,360; *webbing,* Everlastik, Inc., \$31,615.48, United Elastic Corp., \$119,319.62; *wire,* Acorn Insulated Wire Co., \$2,019; John A. Roebling's Sons & Co., \$2,327, Rome Cable, \$398,583, Simplex, \$1,718.75.

Rubber Tax Regulations[1]

The following information has been received from the Deputy Commissioner of Internal Revenue in reference to section 3406(a)(7) of the Internal Revenue Code, as added by section 551 of the Revenue Act of 1941, which imposes a 10% tax on rubber articles.

"The term 'rubber' as used in section 3406(a)(7) includes all compounds or mixtures containing crude rubber which have the properties commercially or generally attributed to rubber and which compounds or mixtures are used as component materials in the manufacture of articles or sold as finished articles for consumption. The term also includes reclaimed rubber and hard rubber dust but does not include so-called synthetic rubber. For an article to be subject to tax, the weight of the rubber compound or mixture must exceed the weight of each other single component, such as cotton, wool, silk, wood, glass, iron, steel, brass, copper, etc. Items described as fillers, pigments, chemicals, accelerators, and reclaimed load are regarded as constituents of the rubber component."

Regulations with respect to rubber articles are being promulgated, and when completed, copies may be obtained from district collectors of internal revenue. In the meantime there is available from the same source or from the Superintendent of Documents, Washington, D. C., (price 10¢), "Regulations 46 (1940 Edition) Relating to Excise Taxes on Sales by the Manufacturer under Chapter 29, Subchapter A, of the Internal Revenue Code." The administrative provisions of Regulations 46 are applicable to the tax imposed on rubber articles, and therefore we believe that this booklet should be read by all those who are affected by the new tax, but who are not acquainted with its provisions.

[1] See India Rubber World, Nov. 1, 1941, p. 171.

Certificates of Necessity Issued

The National Defense Advisory Committee, Washington, D. C., in recent listings of Certificates of Necessity granted for plant expansion included the following: American Cyanamid & Chemical Corp., facilities for oleum, \$86,000; Anaconda Wire & Cable Co., New York, cable, \$236,000; Baldwin Locomotive Works, Eddystone, Pa., castings, propellers, and propeller wheels for vessels, \$75,000; Barrett Co., distilling tar for chemicals, \$17,000, chemicals, \$149,150; E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., methylmethacrylate, cast sheets for aircraft, \$30,000; Firestone Tire & Rubber Co., Akron, O., rubber products, \$35,000, carriage assemblies, \$932,500; General Cable Co., New York, wires and cables, \$407,000; Goodyear Fabric Corp., Akron, barrage balloons, \$68,000; Goodyear Tire & Rubber Co., Akron, barrage balloons, life rafts, vests, etc., \$103,000, reclaimed natural rubber and synthetic rubber compounds, \$38,000; Monsanto Chemical Co., St. Louis, Mo., chlorinated diphenyl, sulphuric acid, etc., \$917,000; Norton Co., Worcester, Mass., abrasives, \$45,000; Russell Mfg. Co., Middletown, Conn., webbing, \$77,000. United States Rubber Co., New York, bullet-sealing plane tanks, \$6,000; Yarnall-Waring Co., steam traps, gages, etc., \$40,000.

Certification enables manufacturers to avail themselves of the 60-month tax amortization plan. Certification, however, does not mean that such expansion will necessarily occur.

The Office of Price Administration, Washington, D. C., according to Administrator Leon Henderson on November 14, is speeding work on a price schedule establishing ceiling prices on copper wire and cable, following a meeting on November 13 with representatives of more than 30 companies in the industry, as well as a series of individual conferences with various firms. Price movements in the copper wire and cable field have been irregular during the past year; some products moved up as much as 40%, while others held virtually constant. It is expected that the price schedule will take account of these varying trends with some quotations being reduced substantially. The industry was asked not to charge prices higher than those prevailing October 15, in a letter sent of October 29.

United States Department of Agriculture, Washington, D. C., has sent two of its experts, Wilbur A. Harlan, of the Office of Foreign Agricultural Relations, and B. H. Thibodeaux, of the Bureau of Agricultural Economics, as members of a party organized to survey the resources of Bolivia under an exchange of notes between the two governments.

Martindell Molding Co., Trenton, N. J., is operating 24 hours a day with 58% of its production defense orders.

Allocation of Critical Materials

Preparation for the allocation of all critical materials throughout American industry was called for November 7 in parallel actions by the Supply Priorities and Allocations Board and the Office of Production Management. The former decreed that, where feasible, the allocation programs should be so developed that minimum quantities of needed materials would be assured to essential industries whose operations are curtailed.

The SPAB has requested the OPM to secure detailed production programs, industry by industry, for 1942, which should give the month-by-month requirements of critical materials needed for military, industrial, and civilian items, essential public services, and for repair parts and capital expenditures.

The development of an allocation program will proceed, roughly, as follows. First, an industrial branch in the OPM will call on its several sections to develop requirements programs for each industry which makes products for which the branch is responsible. Then each program will be built up by the branch or its section through consultation with the industry advisory committee involved and also through discussion with either or both of the Armed Services, where necessary. Next the officers of the industrial branch will discuss the entire matter with industrial branches having jurisdiction over the materials or the products out of which the article in question is made. Agreement will be reached between the branches as to the amount of material which can be allocated, etc.

Since all programs must be decreased or increased as armament output rises, each program will be so framed that it can be modified as needed. After the program has been drawn up, it will be scrutinized to cut down on critical materials by simplification of lines, substitution, etc. This work will be done in conjunction with the OPM Bureau of Industrial Conservation.

After the program has been approved by the branches involved it will be presented to the SPAB executive director for synchronization with other programs. Following approval by the SPAB, the program will be referred to the Priorities Division of the OPM, charged with making it effective and seeing that needed supplies are available.

Widening of Priority Ratings

The OPM on November 25 gave details of its new production requirements plan designed to simplify the priorities procedure for manufactures, which will replace, probably starting January 1, the old defense supplies rating plan. Under the new system manufacturers will be able to plan continuous production schedules next year for at least three months ahead.

Abolished will be the individual PD-1 applications for different defense or essential civilian materials need. Substituted will be form PD-25A, now available from Washington and local OPM field offices. By the use of this form a manufacturer will be able to secure several materials, contrasted with the need of separate forms for each material at present. Manufacturers are urged to get their forms at once, to list their needs for the first quarter of 1942, and file the blanks with the Production Requirements Section, Division of Priorities, OPM, Washington, D. C.

OEM Defense Photo

Robert T. Williams

Priority Specialist, Rubber and Rubber Products Branch, OPM

Data given will include kind and volume of products a manufacturer has been making; priority rating of recent orders; destination or end use of his products; the amount of scarce materials on hand; and anticipated additional material needs for the next three months. In setting the rating to be granted the OPM will consider: the amount of defense or essential civilian output involved; end use of products; materials required; overall policies of the SPAB; recommendations of appropriate OPM industrial branches. Thus the Priorities Division will be able to grant the manufacturer a preference rating geared to his needs and the importance of his products, which can be used continuously over a calendar quarter to secure critical materials. As changing defense orders may affect a manufacturer's anticipated requirements during a quarter interim reports may be filed. Where necessary because of the nature of his business or long-term commitments, a manufacturer may file an additional application covering the following quarter.

Chlorinated Rubber under Rigid Control

All stocks and sales of chlorinated rubber were placed under rigid priority control on October 29 in General Preference Order M-46 which states that "control of the supply and direction of the distribution of Chlorinated Rubber is hereby taken by the Director of Priorities and all future transactions of any kind in Chlorinated Rubber are regulated and covered by the provisions and definitions contained in Priorities Division Regulation No. 1, issued by the Director of Priorities on August 27, 1941, except as otherwise specifically provided herein."

Producers of chlorinated rubber, including all who have the rubber processed for them under toll agreement, or who have purchased, or purchase, it for resale, as well as those engaged in its primary production, may make deliveries only as ordered.

Chlorinated rubber, produced by the Hercules Powder Co., Wilmington, Del., and Firestone Tire & Rubber Co., Akron, O., is usually ordered by the trade names Parlon and Raolin. The temporary allocation of the October production of Hercules, ordered by the Director of Priorities, October 13, is not affected by the new order.

Chlorinated rubber is used in alkali- and acid-resisting paints, electric insulation, flame- and mildew-proofing of fabrics for tents and truck covers, glass wool binders, gaskets, adhesives, coated paper for food packaging, black metal coating for replacement of tin plate, and other miscellaneous purposes.

Barton Murray Resigns

As we go to press, word has been received that Barton Murray has resigned as chief of the Rubber and Products Branch, OPM. No successor will be named as yet, and Mr. Murray will continue to be available as consultant to the Branch.

Other Priorities Announcements

In a further effort to conserve strategic materials including rubber, the Director of Priorities on October 28 ordered a reduction, tentatively scheduled for one year to September 1, 1942, in the output of non-mechanical ice refrigerators, and the next day ordered a curtailment in production of washers and ironers from August 1 through December 31, 1941, by 17.3% below average monthly sales in the year ended June 30, 1941.

The use of cellophane and similar transparent materials as packaging material for or in the manufacture of a very extensive list of articles was banned November 8, as the chemicals used in the manufacture of the transparent sheets are needed for defense purposes. Included in the list are rubber and rubber products, except where the transparent materials are used as a substitute for holland cloth in the backing of retreading stocks for tires.

To broaden the assistance already granted research laboratories, the Priorities Division November 15 assigned a preference rating of A-5 to acquisition of the scarce materials required by manufacturers of the necessary laboratory chemicals and equipment.

Personnel Appointments

Austin Kuhns, Farrel-Birmingham Co., Inc., Buffalo, N. Y., is on the turbines and gears defense industry advisory committee appointed October 22.

A. E. Mervine, assistant general sales manager, New Jersey Zinc Co., and Irwin Cornell, vice president, St. Joseph Lead Co., both of New York, N. Y., are members of the die casting defense industry advisory committee.

Lee J. Bornhofen, manager of sales, promotion, Goodyear Tire & Rubber Co., Akron, has been loaned to the OPM for an indefinite period to help organize its Industrial Promotion Section under the Division of Contract Distribution.

Decrees on Auto Output

Another one-month extension, this time to January 31, 1942, of the program to facilitate production of heavy motor trucks, medium trucks, and truck trailers, was announced November 6 by the Director of Priorities. In consequence, during the five months beginning September 1 producers may manufacture five-sixths the number of medium motor trucks, truck trailers, and passenger carriers produced during the first half year, except that trucks ordered for specific defense purposes are not limited.

Maximum January production of light trucks (less than 1½ tons) for civilian use was reduced on November 14 by 35.9%, or to 24,169 units, of the 37,730 light trucks produced in January, 1941. Companies manufacturing both passenger cars and light trucks may exceed the ceiling on truck output if passenger car production is correspondingly cut so that combined quotas are not exceeded. Light truck production in the first half of the new model year (August 1, 1941.-January 31, 1942) will total 145,018 units, against 171,260 in the corresponding period a year ago, a reduction of 15.3%. The program is designed to effect a 30% reduction for the full model year.

On November 14, Mr. Nelson issued orders also for extending from December 31 to January 31 the replacement parts program for passenger cars and light trucks, setting a top quota for spare parts production and granting priority assistance in obtaining materials needed to assure continued operation of automobiles and light trucks now on the roads.

On November 19 passenger automobile production for February, 1942, was reduced at least 56.1% (to 174,122 cars) of the 396,521 made in February, 1941. No guarantee was given, moreover, that sufficient materials would be available to meet even this reduced figure. For the first seven months of the 1942 model year production may not exceed 1,402,187 cars, compared with 2,325,028 made from August 1, 1940, to March 1, 1941, a decrease of 39.7%. By the year-end a cut of at least 50% is expected.

The automotive, transportation, and farm equipment branch of the Civilian Supply Division, OPM, is seeking a government order to freeze 1942 passenger car model designs, thus eliminating retooling for 1943 models and conserving materials. It has also been suggested that models be simplified.

EASTERN AND SOUTHERN

Dividend Suit Settled

Treasurer Arthur Surkamp, of United States Rubber Co., 1230 Sixth Ave., New York, N. Y., has announced that payment of the company's common dividend of 50¢ a share, declared March 5, but held up by litigation, was made November 19 to stockholders of record on April 16, 1941.

In an explanatory note accompanying the dividend checks, Mr. Surkamp said: "Payment has been delayed due to the suit filed by a preferred stockholder, but the Federal Circuit Court of Appeals at Philadelphia recently [November 3] decided in favor of the company, and the restraining order which precluded earlier payment has just been vacated."

On March 5 company directors voted payment of the dividend on April 30 to stockholders of record on April 16. Shortly thereafter a preferred stockholder sought to restrain the company from making the payment on the ground that the company had earnings in 1935, 1936, and 1937 from which dividends should be paid on the preferred stock before disbursements were made on the common. The company contended that no preferred dividend was possible because of deficits existing during this period. The Federal District Court at Newark on July 7 denied the application of the preferred stockholder, who then appealed to the United States Circuit Court of Appeals.

Los Angeles Plant Expanding

C. L. Remy, factory manager of the Los Angeles, Calif., plant, has announced that the company is installing a system for the bulk handling of carbon black.

The company is also expanding its Los Angeles plant to triple output of airplane bullet-puncture-sealing fuel tanks. The addition will provide 226,200 square feet of floor space, one-third the plant's total, to be used exclusively for assembling the tanks. The addition, to be completed in six months, will call for several hundred additional employes. The remainder of the plant will continue to make tires, many for defense.

Personnel Mention

Francis B. Davis, Jr., (Class of 1906), U. S. Rubber president and chairman on December 6 at the twenty-first annual party of the Montclair Yale Club, at Montclair, N. J., will receive the Montclair "Yale Bowl", silver reproduction of one designed and wrought by Paul Revere and given annually to the Yale alumnus who has made his "Y" in life. Mr. Davis is the fourteenth to get the award.

U. S. Rubber has transferred its Southern Divisional Jobber Tire Sales Division from Memphis, Tenn., to New Orleans, La., and thereby created a larger Southern Division and sales force out of New Orleans, according to Fred D. Bauer, divisional manager of the southern district. The new southern district comprises: New Mexico, Texas, Oklahoma, Mississippi, Louisiana, Tennessee, Alabama, Florida, Georgia, and North and South Carolina.

The Blaw-Knox Co., Pittsburgh, Pa., through its Chemical and Process Engineering Department, has been awarded contracts totaling about $3,000,000, by two companies building synthetic rubber plants: Naugatuck Chemical Division, United States Rubber Co., with a plant being erected at Naugatuck, Conn.; and the Firestone Tire & Rubber Co., which will construct one of the government authorized plants at Akron, O. For these projects Blaw-Knox will design, fabricate, and install the processing equipment to make the synthetic latex. The company reports that the design and fabricating work is well under way, and fabrication will start soon.

Crescent Insulated Wire & Cable Co., Trenton, N. J., has announced two new products: electro galvanized steel strip and a steel back strap for strapping, both for defense work, according to Vice President C. Edward Murray, Jr. The Crescent concern is now able to get more raw material, has rehired former employes laid off some weeks ago, and is operating 24 hours a day. It has also contracted for a three-story addition to cost $10,000.

Pittsburgh Plate Glass Co., 2029 Grant Bldg., Pittsburgh, Pa., has developed Tankhide for metal protection as a substitute for aluminum paint in combating rust. In the preparation of this new, two-coat industrial finish, the primer selected incorporates the use of known rust-inhibiting pigments in a specially selected synthetic resin vehicle, which stop the formation of rust at the source. With good adhesion of the primer to large metal surfaces, an excellent bond is said to be provided for the succeeding finish coat. Tankhide also has sufficient flexibility to meet the expansion and contraction of steel under widespread temperature changes.

American Management Association, 330 W. 42nd St., New York, N. Y., held a two-day conference, November 18 and 19, at Hotel William Penn, Pittsburgh, Pa., to discuss manufacturing methods and problems under defense production. Attendance numbered well over 600 executives. Among the speakers were Walter L. Tann, planning and control engineer, Farrel-Birmingham Co., Inc., Ansonia, Conn., who dealt with "Selection and Training of Inspectors"; J. Stanley Burrows, general foreman, floor division, Armstrong Cork Co., Lancaster, Pa., who talked on "Supervision"; and Arthur R. Gow, vice president and factory manager, The Seamless Rubber Co., New Haven, Conn., who treated of "Inventory Control."

Standard Oil on Synthetics[1]

The Standard Oil Co. (New Jersey), 30 Rockefeller Plaza, New York, N. Y., reports that the Standard Oil Co. of Louisiana's refinery at Baton Rouge will turn out 15,000 tons a year of butadiene as part of a program to provide annually 40,000 tons of Buna S. Styrene for Buna S is now derived from coal tar benzol, but can be made from petroleum if greater quantities are required. At the outbreak of the war Germany had an annual production capacity for Buna S of 25,000 tons, with expansions plans up to at least 75,000 tons a year. Added to her production capacity for Buna N, this would have given her a synthetic production roughly equal to her normal imports of the natural product. Russia also is known to have developed a variation of Buna from alcohol, and Italy was erecting a Buna plant when she entered the war.

The basic raw materials for Buna rubbers are petroleum and natural gas, which are worth less than 1¢ a pound in the crude form. As a far-distant goal we might look forward to finished synthetic rubbers at a price under 10¢ a pound. This prospect is improved by experiments with Butyl rubber, in which the primary raw materials are easier to derive from petroleum than butadiene. But Butyl is not yet equal to Buna S as a tire material.

The prospect is that some tires will be made with side walls of natural rubber and treads of Buna S. It is probable that because of their special qualities (some synthetics have shown promise of lengthening the life of anti-skid tread by 15%), these tires could be sold at a premium with no loss to the consumer.

One of the first questions to be asked about the Buna S to be produced in government owned plants, and one of the most difficult to answer with any degree of certainty is, what will it cost? For the first year this may be about 25¢ a pound, with perhaps a 5¢ variation either way. The true competitive value of synthetics and natural rubber from a price standpoint can only be determined by experience in commercial use.

If it is agreed at the outset that it is to the advantage of this country to maintain a certain amount of rubber producing capacity within its own borders rather than to depend exclusively on imports over a long and exposed ocean route, then certain steps are necessary if the synthetic industry is to become established on an economically sound foundation.

(1) Unified control of rubber imports should gear in with the export control now exercised by rubber producing countries. This might be a modification of the emergency program being carried on by the Rubber Reserve Co., which now has complete control over all rubber exports.

(2) The agreed-upon minimum percentage of our total rubber requirements to be produced in the United States would be purchased from any domestic supplier who was willing to risk his capital in that business and would be sold at whatever price it would bring.

(3) Any loss due to the higher price of synthetic, as compared with natural rubber, would be spread over the total rubber tonnage imported from foreign producing countries by a mark-up in price. This would be in the nature of an insurance premium paid by the consumer as the price of insuring a domestic supply, regardless of political events abroad or ability to maintain open sea lanes.

In the long run the price of rubber to the American consumer might conceivably be lower than it is at present if the government agency had the power to increase domestic production at its discretion. For then it would have a bargaining weapon to use in dealings with rubber producing countries, since it is axiomatic that continuous and effective economic pressure is needed to assure maintenance of a fair price and progressive reduction in costs of any commodity, be it rubber, steel, or tin.

[1]Abstracted from "The Future of Synthetic Rubber." *The Lamp*, Oct., 1941, pp. 14-18.

Neoprene Marks Tenth Anniversary

The tenth anniversary of the introduction of neoprene was marked on November 2. On that day in 1931, at a meeting of the Rubber Division, A. C. S., in Akron, O., F. B. Downing, W. H. Carothers, and Ira Williams, each speaking for a group of chemists participating in the research work, announced that the controlled polymerization of chloroprene had been achieved. So great was the confidence of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., in the new product, which at first was called "DuPrene", that construction of a plant for its manufacture was begun at Deepwater, N. J. Although initial production rates called for only 250 pounds a month, to sell at over $1 per pound, so many applications were found during the decade for neoprene that today approximately 1,500,000 pounds are produced monthly, with the price reduced by nearly 50%.

New Abstract Service on Resins, Rubbers, and Plastics

Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y., announces that it will institute a new loose-leaf abstract service in January, 1942, which will cover the chemistry, physics, and technology of resins, rubbers, and plastics. The cost of the new literature service, which will summarize articles from many domestic and foreign periodicals, will be $35 yearly, which will entitle subscribers to receive 12 monthly (or 24 semi-monthly) mailings of abstracts. The aim will be to make the abstracts comprehensive in character and to include tables, curves, and flow sheets. A specially adapted decimal system, designed to facilitate cross-reference work, will be utilized in filing abstracts in the loose-leaf binder.

Changes at R. T. Vanderbilt Co.

The R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y., has named Ervin S. Kern as assistant to E. B. Curtis at the New York office. A graduate of the University of Missouri, Mr. Kern spent six years with The B. F. Goodrich Co., Akron, O., working first in the laboratories and later with the sales divisions. Mr. Kern has been a member of the sales staff of the Vanderbilt Co. since October, 1932, first with headquarters in Chicago, Ill., and more recently in Detroit, Mich. John R. Shroyer, who has been with Fisher Body, Detroit, for the last five years, where his attention was given to automotive rubber parts, has been named to continue Mr. Kern's sales activities in the Detroit territory. Mr. Shroyer's experience also includes ten years' work on compounding and engineering problems with the Inland Mfg. Co., Dayton, O.

Firm Takes over Climax Plant

The Rubber Corporation of America, a newly organized corporation employing several hundred workers to fill defense needs, has taken possession of the plant formerly used by the Climax Rubber Co., at 274 Ten Eyck St., Brooklyn, N. Y. The machinery and patents of the former Dickinson Tire Co., have been purchased by the new corporation. The officers are: Col. Waldemar Kops, president; and Solomon Z. Melup, vice president and managing director.

The Baldwin-Southwark Division of The Baldwin Locomotive Works, Philadelphia, Pa., has received an order from the Russian Government, through Amtorg Trading Corp., for ten large extrusion presses and auxiliary equipment valued at approximately $2,250,000.

Whitehead Bros. Rubber Co., Trenton, N. J., is erecting another addition, two stories, 85 by 35 feet, with 6,000 square feet of floor space, to take care of mill room production.

American Petroleum Institute, 50 W. 50th St., New York, N. Y., recently named its general committees for 1942 and included the following: J. Howard Pew, Sun Oil Co., Philadelphia, Pa., vice president of the refining division and *ex-officio* chairman of the general committees; H. M. Stalcup, Skelly Oil Co., Tulsa, Okla., division of production general committee; and W. F. Burt, Socony-Vacuum Oil Co., Inc., New York, and A. E. Pew, Jr., Sun Oil, on the division of refining general committee.

C. Y. Neff, service manager of the aircraft products division of Hewitt Rubber Corp., Buffalo, N. Y., recently returned from a two-month stay in England where he conducted an extensive first-hand study of aircraft bullet-sealing fuel tanks operating under actual war conditions.

United Carbon Co., Charleston, W. Va., on October 17 formally opened its new 12-story building on Kanawha Blvd. at Broad St. So great was the interest aroused in the affair that the local papers *The Charleston Daily Mail* and *The Charleston Gazette*, issued special United Carbon supplements giving highlights of the career of the company and its president, Oscar Nelson.

Thiokol Corp., Trenton, N. J., is very busy. Sales Manager Joseph W. Crosby was on a lengthy business trip through the West.

Joseph Stokes Rubber Co., Trenton, N. J., has been compelled to let considerable help go because of its inability to secure rubber under the priority plan, and further lay-offs are expected if conditions do not improve. The plant was closed Armistice Day.

Wm. B. Dunlap, treasurer of the Lee Rubber & Tire Corp., Conshohocken, Pa., recently celebrated 40 years with the company, which he joined September 30, 1901, when it was the J. Ellwood Lee Co., as a clerk in the credit department.

Hercules Powder Co., Wilmington, Del., plans a 50% expansion in chlorinated rubber capacity at its plant at Parlin, N. J., to be completed in February.

The Thermoid Co. and the **Puritan Rubber Co.,** both of Trenton, N. J. are running 24 hours a day; while a number of other New Jersey rubber concerns are working two shifts.

October sales for Thermoid and its domestic subsidiaries totaled $1,026,786, contrasted with sales of $760,222 in October, 1940.

The Rubber Manufacturers Association of New Jersey will hold its annual meeting in December at the Trenton Club, Trenton, N. J., when officers for 1942 will be elected.

I. B. Kleinert Rubber Co., 485 Fifth Ave., New York, N. Y., has named David I. Schoemaker as assistant to George K. Guinzburg, vice president, in charge of the shoe division. Mr. Shoemaker has 12 years' experience with R. H. Macy & Co., New York, N. Y., as buyer for casual shoes, slippers, and rubber footwear.

Kleinert, at the annual dinner of the Chamber of Commerce of the Borough of Queens, December 2, Hotel Commodore, New York, will receive a plaque as first prize for excellence in industrial design for the new Kleinert factory building at College Point.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., will illustrate the applications of neoprene, plastics, and fluid refrigerants in the refrigerating industry at the Fourth Refrigeration and Air Conditioning Exhibition, Chicago, Ill., January 12 to 15. The exhibit will show how various plastics are being used to replace strategic materials. Over 50 applications of plastic refrigerator parts will be displayed, as well as sample neoprene parts in refrigerators and those used by maintenance crews in manufacturing plants.

NEW ENGLAND

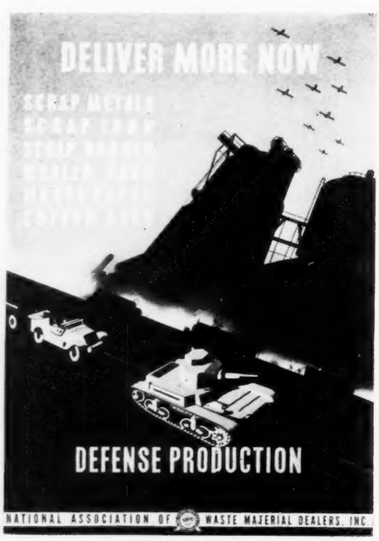
Godfrey L. Cabot, Inc., Boston, Mass., has announced the opening of an Akron office at 710 Peoples Bank Building, Akron, O., with W. D. Anderson in charge.

Delco Rubber Corp., 115 W. Main St., Millbury, Mass., recently was incorporated in Massachusetts to manufacture imitation leather, rubberized fabrics, quarter and sock linings, etc. Operations, to begin early this month, will involve about 40 employes. Officers of the company include Frank W. De Luca, president and treasurer, H. F. De Luca, assistant treasurer, and A. De Luca, clerk.

Rhode Island rubber manufacturers during October paid out $493,761 in wages, a gain of 0.8% over September and 77% over October, 1940. Electric power consumption by the industry totaled 3,066,000 kilowatt hours, against 2,124,000 in October, 1940.

Warwick Chemical Co., West Warwick, R. I., has appointed Walter E. Murray textile sales manager.

Collyer Insulated Wire Co., Pawtucket, R. I., will erect a two-story brick and cement factory addition, 92 by 75 feet, to its plant on Waldo St. at an approximate cost of $10,000.



Poster Issued by N.A.W.M.D. to Emphasize the Part the Industry Should Play in the Cause of National Defense

L. Albert & Son, supplier of machinery for the rubber and plastics industries, Whitehead Rd., Trenton, N. J., recently opened a warehouse at 25 Brock St., Stoughton, Mass., where it will carry a complete line of rubber machinery. When the firm is completely established at Stoughton, it will have there a complete machine shop for rebuilding used machinery as well as for building new machinery for the rubber trade and a welding shop for rebuilding and renovating Banbury mixers for the New England district. At present the Albert company is operating 24 hours a day at its Akron, O., Trenton, and Los Angeles, Calif., plants.

PACIFIC COAST

Kirkhill Rubber Co., 711 W. 58th St., Los Angeles, Calif., according to President T. Kirk Hill, is building a 9,000 square foot addition to its St. Andrews Place plant.

Plastic & Rubber Products Co., 2100 Hyde Park Blvd., Los Angeles, Calif., recently was formed by V. S. Anderson and N. O. Hulsey to manufacture items required under national defense contracts for the aircraft industry. The firm, which occupies about 4,000 square feet of floor space, has about 40 employes.

Frank L. Shew, formerly chief chemist of Darnell Corp., Ltd., Long Beach, Calif., is now superintendent of the Arrowhead Rubber Co. of Texas, a branch of the Arrowhead Rubber Co. of California. The firm has taken over the plant of the Bell Rubber Co. on the main highway between Dallas and Fort Worth and will manufacture rubber and neoprene parts principally for the airplane factories in the Southwest as well as for the oil industry.

The National Association of Waste Materials Dealers, Inc., 1475 Broadway, New York, N. Y., recently held a most sucessful fall convention at The Palace Hotel, San Francisco, Calif. C. H. Churchhill, of H. Muehlstein & Co., Inc., Los Angeles, Calif., was an honorary member of the convention committee; while Irwin M. Desser, of Desser Tire & Rubber Co., Huntington Park, Calif., was on the banquet committee. The "Muehlstein Trophy", donated two years ago by Julius Muehlstein, to be given the player having the lowest gross in the fall golf tournament went to T. Sall, of Los Angeles. Among the numerous other contributions and prizes donated for convention activities were those from the Desser company, the Muehlstein concern, and A. Schulman, Inc.

OHIO

Goodrich Founder Honored

November 4, one hundredth anniversary of the birth of Dr. Benjamin Franklin Goodrich, who founded the B. F. Goodrich Co. in Akron in 1870, was marked by colorful ceremonies at his birthplace in Ripley, N. Y. Participating in the affair, held on the campus of the Ripley Central School, were his son, Col. David M. Goodrich, chairman of the board of the company; John L. Collyer, president; A. L. Hupfer, president of the Goodrich Twenty-Year Club; other executives of the company; members of the Goodrich family; and Clifford L. Lord, director of the New York State Historical Association. Highlight of the occasion was the dedication of a memorial to Dr. Goodrich, consisting of a 3½-ton polished black granite block and two marble benches set against a background of perennial trees and shrubs. The block, which stands 6½ feet high, bears the following inscription:

"Ripley, New York. Birthplace of Dr. Benjamin Franklin Goodrich, 1841-1888. A great son of this state. Founder of the B. F. Goodrich Company, Akron, Ohio, 1870. This memorial sponsored by the New York State Historical Association on the centennial of his birth, November 4, 1941."

Dr. B. F. Goodrich

John L. Collyer *(Left)*, David M. Goodrich *(Center)* and Clifford L. Lord *(Right)* at the Dr. B. F. Goodrich Memorial in Ripley, N. Y.

Personnel Activities

Arthur W. Carpenter, manager of the Goodrich testing laboratories, is a member of the A.S.T.M. committee to select the Edgar Marburg Lecturer for 1942.

Waldo L. Semon, prominent Goodrich research chemist and vice president of Hycar Chemical Co., Akron, writing in the annual refinery issue of *World Petroleum* on the future of synthetic rubber, stated that the synthetic can develop an entirely new field of industrial utility without replacing natural rubber in those fields it now so adequately serves. He further declared that Goodrich has expanded its privately financed synthetic rubber production to 7,000 long tons a year, which, coupled with the 10,000-ton plant to be constructed with government funds at Louisville, will provide the company's synthetic rubber affiliate, Hycar Chemical, with a capacity four times that of the entire nation last year. Thus this 17,000 tons expected by the end of 1942, to be produced by Goodrich alone, compares with the 20,000 tons a year that the Department of Commerce reported Nazi Germany had attained at the beginning of the war after years of effort.

A bright future for synthetic rubber was predicted by Mr. Collyer in an address on October 31 before the Cornell Society of Engineers at the Cornell Club, 107 E. 48th St., New York, N. Y.

First-hand information from Commander A. N. G. Firebrace of the London Fire Brigades Division to J. H. Connors, vice president in charge of the Goodrich mechanical goods division, indicates that fire trucks in the future may resemble armored tanks, but their turrets will be equipped with hose nozzles instead of guns. A small hand-drawn rotary pump with a capacity of from 350 to 500 gallons per minute may easily be pulled through littered streets, it was further learned, and the "stirrup pump", a small hand-pump equipped with a 35-foot hose and a two-way nozzle which may direct either a spray or a jet of water toward incendiary bombs, was also described. An incendiary bomb generating 2,000 degrees of heat reportedly may be extinguished with six gallons of water.

Tire Sales Advance

In the face of rubber curtailments and defense needs for rubber, tire sales have advanced to a level indicating that 1941 will be the greatest tire sales year since 1929, according to President Collyer. It was said that tire sales, amounting to 48,395,931 units, increased 24.6% during the first eight months of 1941 as compared for the corresponding period last year. Gains in the replacement market, amounting to 17.4%, as well as advances in the original equipment and exports sales were noted.

President John L. Collyer recently stated that, spurred by vast Lend-Lease food requirements and the mounting food needs of America's defense workers, industry sales of pneumatic farm service tires are expected to hit the high of $34,000,000 this year, against $22,000,000 in 1940 and $18,000,000 in 1939. About 1,400,000 rubber-shod tractors are in service and about $100,000,000 in farm tires have been sold in the 14 years since Goodrich technicians pioneered with Prof. R. U. Blasingame, of Pennsylvania State College, in adapting pneumatic tires to farm service.

Other factors contributing to the high sales of farm tires are: the changeover from steel wheels to pneumatics on farm equipment because of the great need of steel for defense items; the shortage of farm labor due to the draft and higher-paid defense jobs, necessitating increased efficiency of farm equipment; and the development of small low-cost tractors and combines designed specifically for 100-acre farms.

Improved Tires

A dual-advantage tire for the front wheels of farm tractors has been developed by Goodrich. Called the Multi-ring Silvertown, the new tire combines the principles of the Skid-ring tire, resulting in easier steering and less side-slip, with those of the long-wearing rib-type tractor tire. Main feature of the new tire is the retention of the central ring of the Skid-ring tire and the incorporation of two shoulder rings on each side of the center unit to protect the sidewalls against scuffing and chafing. Made of sun-resisting rubber further fortified with Duramin, the new tire is available in a complete range of sizes.

The latest pneumatic tire for use on industrial tractors is called the Industrial Tractor Type Silvertown and is designed to equip the traction wheels of small farm-type tractors which are finding wide use in industry because of their mobility and speed. Available in two sizes, 8-24 and 9-24, the new tire features an unusually thick tread.

Six new tires built with rayon cords, or Rayo-Flex construction, for "stop-and-go" trucking operations have been added by Goodrich to its Store-Door Silvertown line, which features tires designed for long mileage requirements and with greater reserve carrying capacity. The new tires, with the designation SD, are available in sizes with load-carrying capacities of 2,200 to 4,800 pounds, replacing conventional-size tires ranging from the 7.50-20 to 11.00-20.

For use in plants where static electricity constitutes a fire and explosion hazard, the Goodrich company now manufactures the Conductor Industrial Tire of a special rubber compound said to have a million times the electrical conductivity of casings of ordinary rubber. These tires, in a complete range of sizes for pressed-on and vulcon types, have been designed to prevent ac-

cumulation of any charge of static electricity large enough to produce a spark when the vehicle contacts another object and are expected to be particularly useful in factories making armament, gun powder, or other inflammable or explosive goods.

Tests conducted by Goodrich revealed that where industrial vehicles ran across floors of cement, brick, stone, or metal, the new tires continually dissipated the static electricity and kept vehicle and floor at the same electrical potential.

An initial application of the special compound used in the new tire was for aircraft tail-wheel tires to bleed off static electricity, built up during the plane's flight, upon contact of the wheels with the ground.

Hose Tube of Ameripol

Goodrich is now marketing a new type of hose for all standard paint and lacquer spraying equipment, with the tube built of the synthetic rubber Ameripol, which will replace the company's Lacquer hose and its Mainstay line of paint spray hose. With this new addition Goodrich now has a full range of synthetic-rubber lined hose from ¼-inch inside diameter to the 10-inch inside diameter Type 400 oil hose.

Rubber in Defense Vehicles

More than 75 tons of rubber are used in the makeup of a 35,000-ton battleship, according to a recent survey on the importance of rubber in national defense. Even the 28-ton medium-size tank requires about 1,750 pounds of the resilient material. Goodrich also reports that the use of rubber in the manufacture of combat airplanes accounts for more than 50 different articles of natural and synthetic rubber, for such items as bullet-sealing fuel tanks, tires, as well as deicers.

Vibro-Insulators, according to the Goodrich company, are being successfully applied by the War Department to isolate vibration by laboratory instruments resulting from gun shock at an Army proving ground.

Goodyear Announcements

The Goodyear Tire & Rubber Co., Akron, once again has made the gigantic balloons for the eighteenth annual Thanksgiving Day parade sponsored by R. H. Macy & Co., Inc., New York, N. Y. The number of balloons this year was increased from five to seven.

To assist employes to purchase United States Defense Savings Bonds, Goodyear has arranged for installment purchases through easy and regular payroll deductions. Goodyear is entering into this arrangement in response to the direct request of the U. S. Government for such cooperation.

Personnel Changes

John Oakley, manager of tire design at Akron, has been transferred to new duties at the Goodyear plant at Sao Paulo, Brazil.

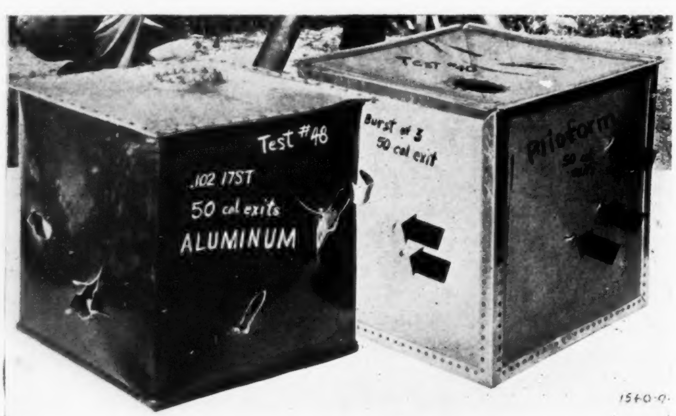
D. A. De Francis, Goodyear export representative in Portugal and Spain for 12 years, recently visited Akron before being transferred to Havana, Cuba. Serge Wulff, one of the few Goodyear men still in southern Europe, who had served in France, Morocco, Persia, Arabia, and Switzerland, has been assigned to the Portugal post.

George E. Price, Jr., general purchasing agent at Goodyear, is chairman of the business survey committee of the National Association of Purchasing Agents.

Plioform Fuel Tank

Plioform, a Goodyear rubber derivative, when used as the outer shell of fuel tanks for planes and combat vehicles in place of aluminum, does not flare under gun fire and will not burst under crash impact as metal tanks have been known to do, according to P. W. Litchfield, Goodyear board chairman. When an aluminum shell is penetrated by heavy calibre bullets, particularly if the bullets "tumbled" while passing through the tank, the projecting splinters of metal would tend to hold open the punctures of the inner self-sealing rubber tank lining, Mr. Litchfield pointed out.

Besides providing superior equipment the use of Plioform would eliminate one drain upon the nation's aluminum supply, according to the statement, which also predicted increased production of this rubber derivative.



Fuel Tanks after Penetration by 50-Calibre Machine Gun Bullets; Left, Aluminum Tank; *Right,* Plioform Tank

New Tractor Tire

The Goodyear Triple Rib front-wheel tractor tire, featuring a center rib and two shoulder ribs, is said to improve steering and resistance to side-slip on turns because of the high center rib; while the shoulder ribs reportedly minimize scuffing and sidewall wear. The wide tread pattern and shoulder ribs are claimed by the manufacturer to supply maximum flotation in loose, sandy, and muddy soil.

Conductive Flooring for Munitions Plants

For use in munitions plants where accidental sparks of static electricity might ignite powder stores, a rubber flooring, said to be spark resistant and a good conductor of electricity, is manufactured in four gages, from ⅛- to ⅜-inch, by Goodyear. It is also claimed that the flooring resists the action of many chemicals, such as ether, alcohol, nitric, hydrochloric, and sulphuric acids, in addition to explosives in powdered, liquid, or gaseous form. The flooring reportedly maintains a smooth, level surface, free from cracks, ridges, or depressions, and is unaffected by heavy loads or temperature changes. Black in color, the flooring has a smooth plate finish and may be cleaned with steam, clear lukewarm water, or dilute aqueous solutions of ammonia. It is reported that the material is also satisfactory for work bench tops.

Pliofilm-Wrapped Fruits Longer Lasting

Goodyear has reported that a new technique in wrapping citrus fruits in Pliofilm extends preservation of these products for months at regular refrigerating temperatures. Tests by the Florida Agricultural Experiment Station at Gainesville revealed that Pliofilm-wrapped grapefruit stored at 70° temperature for seven months retained its texture and juices, and seeds showed no indication of sprouting. This successful application of Pliofilm is due to the fact that it allows transmission of carbon dioxide with enough rapidity to keep the fruit from suffocating, but transmits moisture vapor slowly enough to prevent loss of moisture, thus retaining the juices and fullness of the fruit as well as preserving its valuable vitamin content.

Research engineers currently are developing machinery to handle large-scale Pliofilm wrapping of various citrus fruits.

Similar successful experiments have been conducted elsewhere on wrapping apples in Pliofilm.

W. E. Palmer, secretary and assistant treasurer of the Seiberling Rubber Co., Akron, recently was reelected Grand Recorder of the Grand Commandery of the Ohio Knights Templar.

Thomas Elected Firestone Chairman; Firestone, Jr., Now President

John W. Thomas, president of the Firestone Tire & Rubber Co., Akron, since the death of Harvey S. Firestone, Sr., in February, 1938, was made chairman of the board, a position held only by the late founder of the company. At the same time the directors at their meeting on November 7 elected Harvey S. Firestone, Jr., who had been vice president since 1929, as president of the company. Lee R. Jackson, vice president in charge of sales, was elevated to the newly created post of executive vice president; while Treasurer John J. Shea assumed the additional office of vice president. H. D. Tompkins, Mr. Jackson's assistant, succeeded him in the sales vice presidency.

Harvey S. Firestone, Jr., (Right) Presenting to E. W. Brandes, of the Bureau of Plant Industry, United States Department of Agriculture, a Shipment of Rubber Seeds (Hevea Brasiliensis) from the Firestone Plantations in Liberia, West Africa, Which Was Recently Sent to Brazil toward the Reestablishment of the Rubber Growing Industry in Latin America

World's Largest Bomber, the Douglas B-19, Equipped with Firestone Tires Which Stand Eight Feet High; Each Tire Weighs 961 Pounds, Contains 148 Miles of Cotton Cord and Three Miles of Bead Wire, and Is Designed to Carry Half of the Plane's Total Weight of 82 Tons

Tire News

The company recently announced a new popular priced, first-quality tire, "Super Champion", which features "Vitalin", a material said to give increased mileage; a new type of Safti-Stop Gear-Grip Tread; and the patented Safti-Lock Gum-Dipped Cord Body.

Firestone for the past nine months has been conducting special four-week training schools in Akron for the Quartermaster's division of the United States Army to instruct men from camps all over the country in the care and repair of tires, wheels, brakes, spark plugs, and batteries. Special classes are also being held in retreading and recapping tires.

Saran[1] on Exhibition

Firestone is exhibiting at the Modern Plastics Exposition, which opened in the United States Department of Commerce Building, Washington, D. C., November 19, applications of Saran, a stainless, flexible plastic fabric woven like cloth and used as upholstery for furniture and vehicles. Saran is adaptable with Firestone Foamed Latex cushioning.

General Tire & Rubber Co., Akron, according to L. A. McQueen, vice president in charge of sales, in order to coordinate the many General Tire defense projects with the government and to make available to the government all information about General defense activities and manufacturing facilities, has set up a special office in the Investment Bldg., Washington, D. C. Heading this new organization is Daniel A. Kimball, for more than 21 years Pacific Coast district manager for the company. In order that an engineer may always be on the ground, V. H. Orr, of the engineering department at company headquarters, has been assigned to serve as engineering consultant for the Washington office.

The Forest City Rubber Co., 1272-76 Ontario St., Cleveland, according to President Wm. E. Crofut, Jr., has changed its name to Forest City Products, Inc.

[1] See "New Subway Seat Developed by Firestone." INDIA RUBBER WORLD, Sept. 1, 1940, p. 47.

MIDWEST

Decision on Melamine Resin Patent

Monsanto Chemical Co., St. Louis, Mo., has been awarded the basic patent on melamine resins. The patent, No. 2,260,239, was issued October 21, 1941. Inasmuch as important subsidiary patents relating to the melamine resins field have been granted in this country to American Cyanamid Co., as well as Ciba Products Corp. interests, arrangements have been concluded whereby licenses granted by the owners of these subsidiary patents will include rights to operate under the basic Monsanto patent.

Thirty-five rubber firms in the Midwest recently reported paying 24,550 workers $790,000 in wages, respective declines of 1% and 9.6% from the previous month.

Midwest Rubber Reclaiming Co., East St. Louis, Mo., Ill., has transferred Alvin Fuhrmann, since 1937 in technical sales, from Detroit, Mich., to company headquarters.

Technical Committee A on Automotive Rubber, joint A.S.T.M-S.A.E. committee, has recently appointed a new Sub-Committee IV to work on the problem of rubber conservation by means of voluntary restriction of specifications. A meeting of Technical Committee A has been scheduled for December 3 at the Book-Cadillac Hotel, Detroit, Mich.

Morenci Rubber Products, Inc., manufacturer of molded and extruded rubber goods, Morenci, Mich., according to Vice President A. A. Bronson, has built a new plant to replace the one destroyed by fire last May. Capacity has been increased and production resumed, largely on defense work.

Union Asbestos & Rubber Co., 310 S. Michigan Ave., Chicago, Ill., effective November 1, elected J. H. Watters, formerly general manager of the Marion Steam Shovel Co., Marion, O., president to succeed L. L. Cohen, now chairman.

The Association of American Battery Manufacturers, Inc., 2706 First-Central Tower, Akron, O., at its seventeenth annual convention in Chicago, Ill., October 30 and 31 elected the following officers: president, B. F. Morris, Thomas A. Edison, Inc.; first vice president, E. T. Foote, Globe-Union, Inc.; second vice president, J. H. McDuffee, Electric Auto-Lite Co.; secretary, A. H. Daggett, National Battery Co.; treasurer, L. D. Doughty, Carlile and Doughty, Inc.; directors, O. V. Badgley, Delco-Remy Division of General Motors Corp., A. J. Baracree, Am-Plus Storage Battery Co., H. C. Montgomery, Hobbs Battery Co., L. Perrine, Perrine Quality Products Corp., W. Perry, Volta Battery Co., and L. B. F. Raycroft, Electric Storage Battery Co.; commissioner, V. L. Smithers, Akron. In view of the shortage of strategic raw materials and the resulting government limitation on production of replacement automobile storage batteries, the Association adopted a resolution that its members concentrate production and sales on those types of batteries that have longer life, better performance, and maximum user value.

National Safety Council, 20 N. Wacker Drive, Chicago, Ill., at its recent National Safety Congress and Exhibition elected the following as the executive committee for the Rubber Section for 1941-1942: general chairman, Ralph Farnum, United States Rubber Co., Detroit, Mich.; vice chairman in charge of program, John L. Grider, American Hard Rubber Co., Butler, N. J.; secretary, K. C. Loomis, Ohio Rubber Co., Willoughby, O.; *News Letter* editor, J. E. Lovas, U. S. Rubber, Passaic, N. J.; engineering committee chairman, J. J. Raytkwich, U. S. Rubber, Mishawaka, Ind.; health committee, Dr. W. S. Ash, U. S. Rubber, Detroit, and Dr. J. Newton Shirley, Arrow Mutual Liability Insurance Co., Newton, Mass.; membership committee chairman, J. J. Loge, General Tire & Rubber Co., Akron, O., publicity committee chairman, Paul Van Cleef, Van Cleef Bros., Chicago; statistics committee chairman, Roland Kastell, U. S. Rubber, New York, N. Y.; members at large, E. W. Beck, U. S. Rubber Co., New York, R. A. Bullock, Corduroy Rubber Co., Grand Rapids, Mich., Oliver Hopkins, U. S. Rubber, Providence, R. I., C. F. Horan, Hood Rubber Co., Watertown, Mass., W. H. MacKay, Dunlop Tire & Rubber Corp., Buffalo, N. Y., Urban L. Moler, Inland Division, General Motors Corp., Dayton, O., R. M. Morse, Firestone Tire & Rubber Co., Akron, William Spanton, American Hard Rubber, Akron, and R. M. Weimer, Dayton Rubber Mfg. Co., Dayton.

Paint Industries Show, held at the Drake Hotel, Chicago, Ill., October 27 to 31, included among its many exhibitors the following: Advance Solvents & Chemical Corp., American Cyanamid & Chemical Corp., Atlas Electric Devices Co., Binney & Smith Co., J. H. Day Co., Hercules Powder Co., National Carbon Co., Inc., Neville Co., and Thompson, Weinman & Co.

CANADA

Review of Chemical Needs of the Rubber Industry

Canadian Chemistry and Process Industries recently reported that last year 52 Canadian firms manufacturing rubber products, mostly in Ontario and Quebec, with the former province employing more than 81% of the capital, had a total output valued at $83,020,721, compared with $69,945,471 for 54 companies in 1939. The value of tire and tube output rose to $41,634,221; while that of footwear dropped to $19,528,586. The total value of materials used was $38,228,145, against $28,814,003 in 1939, and included: raw or crude rubber and gutta percha, $17,553,598; reclaimed rubber, $1,084,528; scrap rubber, $188,566; latex, $585,082; carbon black, $746,240; clays and earths, $90,867; ground mica, $10,984; solvents, $210,013; sulphur, $75,219; soapstone, $4,029; whiting, $106,119; zinc oxide, $605,604; talc, $17,587; barytes, $36,659; other chemicals, etc., $2,238,982; paints, varnishes, $43,264; and rubber cement, $53,775.

Alan H. Williamson, Controller of Supplies for the Department of Munitions and Supply, in reporting substantial progress in the conservation program being administered by the Rubber Advisory Committee of Canada, paid tribute to Canadian rubber manufacturers and processors who have, he said, cooperated in every way to curtail nonessential consumption. Helping to reduce the inventories of manufacturers, wholesalers, and retailers and to broaden the field of conservation, the footwear section of the industry has eliminated 43% of its styles, colors, and lines. At the same time the general rubber and mechanical goods division has, where it was felt that the trade could be served by less extensive lines, stopped production on many articles. The tire section of the industry at present is studying the elimination of certain sizes and lines. Cut rubber thread has been sold on a monthly basis for several months past, and only limited quantities are available.

Hector B. McKinnon, chairman of the Wartime Prices and Trade Board of the Dominion Government, has been also appointed president of a new corporation to deal in commodities and take measures for stabilizing retail prices. His tasks include insuring supplies of raw material, including cotton and rubber. Rubber imports will all be bought by this government purchasing corporation and then resold to Canadian manufacturers. The new crown corporation functions through the Dominion Department of Munitions and Supply.

Canada's waterproofed clothing industry reported to the Dominion Bureau of Statistics a gross production valued at $2,127,642 in 1940, nearly 58% more than the 1939 value. Rubberized coats formed the principal item, with an output of 9,471 dozen, which were valued at $516,975.

The Dominion Department of Munitions and Supply, Ottawa, Ont., recently issued the following contracts: *aircraft,* Firestone Tire & Rubber Co. of Canada, Ltd., $20,793, B. F. Goodrich Co. of Canada, Ltd., $33,848; *clothing,* Dominion Rubber Co., Ltd., $412,838, Kaufman Rubber Co., Ltd., $191,232, Western Rubber Co. of Canada, $9,000; *land transport,* Dunlop Tire & Rubber Goods Co., Ltd., $17,574, Firestone, $30,150, Goodyear Tire & Rubber Co. of Canada, Ltd., $259,392; *rubber products,* Viceroy Mfg. Co., Ltd., $5,330; *fire fighting equipment,* Bi-Lateral Fire Hose Co., $12,096, C-O-Two Fire Equipment of Canada, Ltd., $13,918; Dominion, $12,096, Dunlop, $12,096, Goodyear, $12,096, Gutta Percha & Rubber, Ltd., $12,096.

Canadian Resins & Chemicals, Ltd., Shawinigan Falls, P. Q., recently was formed by Carbide & Carbon Chemical Corp., New York, N. Y., U. S. A., and Shawinigan Chemicals, Ltd., Montreal, P. Q., to manufacture polyvinyl chloride resins, now used largely in cable insulation. The plant, now under construction, is expected to start production in the spring. Shawinigan Chemicals has been prominent in the development of resins through its subsidiary, Shawinigan Resins Corp., Indian Orchard, Mass., U. S. A., 50% of which is owned by the Monsanto Chemical Co., St. Louis, Mo., U. S. A.

Cellophane for wrapping goods including rubber products, but not food, candy, and drugs, has been forbidden in the Dominion because of the need by war industries of glycerine and ethylene glycol, used in making cellophane.

LATIN AMERICA

MEXICO

Cyanamid to Sell Guayule

Cia Hulera de Parros, S. A., Parras, Coahuila, Mexico, announces that its entire output of guayule will be sold exclusively by the Rubber and Rubber Chemicals Department, American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.

Angel Urraza, chairman and managing director of the Euzkada Rubber Co. of Mexico, and his associates in that enterprise are constructing a plant in Cuba for the production of tires and tubes. The B. F. Goodrich Co., Akron, O., has entered into a contract to provide technical supervision for the new plant similar to the arrangement it has had with the Mexican company for some years past.

DUTCH GUIANA

Formerly Surinam produced fairly large quantities of balata, the gum from the so-called bullet tree, which is used in the manufacture of belting, insulations, golf ball coverings, etc. But in recent years outputs have shrunk considerably, amounting in 1940 to only 193 tons (metric) and to 371 tons in 1939, as compared with 788 tons in 1930 and 1,200 tons in 1912.

OBITUARY

Francis R. Henderson

Francis R. Henderson

FRANCIS ROBINSON HENDERSON, prominent crude rubber broker, died in a New York hospital on November 13. His career, marked by the ups and downs of rubber itself, began in 1899 when, at the age of 15, he joined his uncle's concern, Robinson & Co., New York, as office boy. Advancements followed, and in 1909 with his brothers he organized F. R. Henderson & Co., Inc. In 1918 he went to Singapore and purchased the International Trading Co. and a few years later Mr. Henderson organized Henderson, Forbes & Co., with offices in New York and London, England. Then the bottom fell out of the rubber market. In 1925, Mr. Henderson started again by forming the Crude Rubber & Foreign Products Corp. and in 1927 incorporated the F. R. Henderson Corp. Late in 1928 he also organized Henderson Rubber Reports, Inc., and early in 1930 the Basic Commodities Corp. Meantime (1929) he had been elected president of the New York & Republic Corp. In 1931 his firms went bankrupt. Mr. Henderson returned to the industry in 1932 in charge of the rubber department of Clark, Childs & Co., New York.

Mr. Henderson was largely instrumental in the formation of the Rubber Exchange of New York, Inc., in 1925 and became its first president, serving four terms until October 21, 1930. He continued, however, on the board of governors until the Rubber Exchange became a part of the newly formed Commodity Exchange, Inc., in 1933. The deceased served also as president and director of the Rubber Trade Association of New York, and as a director of The Rubber Association, the National Metal Exchange, the National Raw Silk Exchange, the New York Burlap & Jute and the New York Hide exchanges.

Mr. Henderson was born in Port Chester, N. Y., 57 years ago. He was educated in the public schools of Port Chester and Rye, N. Y.

His wife and five daughters survive.

Funeral services were held in New York on November 15.

Henry Gabriels, Jr.

FOLLOWING a spinal operation, Henry Gabriels, Jr., partner in the Sierra Rubber Co., 2472 E. Eighth St., Los Angeles, Calif., died on October 3. A native of Los Angeles, (January 17, 1906), Mr. Gabriels was graduated from the Manual Arts High School there in 1924. He was employed successively as pressman, salesman, and sales manager by the Kirkhill Rubber Co., Los Angeles, from 1924 until 1935, when he formed the Sierra company with Claus H. Vonder Reith. The firm manufactured molded rubber goods, was an agent and fabricator for "Dunlopillo" products, and also acted as agent for Johnson Rubber Co., Middlefield, O., and H. O. Canfield Co., Bridgeport, Conn.

The deceased leaves his wife, a son, parents, and a sister.

Funeral services were held October 6 with interment in Inglewood Cemetery, Inglewood, Calif.

Harry R. Walker

AFTER a two-year illness Harry Raworth Walker, for ten years traffic manager of the General Asbestos & Rubber Division of Raybestos-Manhattan, Inc., Charleston, S. C., until his retirement in 1928, died there October 26. He had previously worked for several railroads.

Charleston was also the scene of his birth on January 13, 1867.

Mr. Walker was an elder in the First (Scotch) Presbyterian Church of Charleston, where funeral services and burial took place October 27.

He leaves his wife, a son, two grandchildren, a brother, two sisters, and several nieces and nephews.

Wm. R. O'Brien

WILLIAM R. O'BRIEN, mechanical superintendent with The Thermoid Co., Trenton, N. J., for 48 years prior to his retirement three years ago, died October 21 at his home in Trenton. He was a pioneer and active member of the Thermoid Beneficial Association, the Holy Name Society of St. Anthony's Church, and the Ancient Order of Hibernians. He is survived by his wife, a son, and two daughters. Burial was in St. Mary's Cemetery, Trenton.

United States Latex Imports

Year	Pounds (d.r.c.)	Value
1939	61,460,003	$10,467,552
1940	75,315,775	14,543,975
1941		
Jan.	4,892,860	1,019,741
Feb.	6,598,930	1,279,648
Mar.	3,822,583	774,225
Apr.	3,570,742	648,217
May	5,895,381	1,117,226
June	4,637,095	936,944
July	4,589,007	930,126
Aug.	4,443,527	779,079

Data from United States Department of Commerce, Washington, D. C.

Samuel H. Clark

Samuel H. Clark

A HEART attack caused the death, on November 14, at his home in Maplewood, N. J., of Samuel H. Clark, since 1916 head of Whittaker, Clark & Daniels, Inc., 260 West Broadway, New York, N. Y., which he had joined 43 years ago. He was, besides, president of Whittaker Micronizing Corp. and of the Reduction Engineering Corp., treasurer of De Mola Color & Chemical Co., Inc., and a director of the Fine Pigments Co.

Mr. Clark was also a prominent layman of the Methodist Church; secretary and a trustee of the Ocean Grove (N. J.) Camp Meeting Association; a trustee of the Methodist Home for the Aged, Ocean Grove; a former member of the executive committees of the National Association of Manufacturers and of the Associated Industries of New York State; a past president of the Mineral Products Association of America; and a member of the Toilet Goods Association of New York, the Paint, Oil & Varnish Association, the Perfumers Association of New York, and the Mineral Products Association of America.

He was born in Newark, N. J., 62 years ago and was graduated from Newark High School in 1897.

Surviving are his wife, two daughters, and a son.

The funeral was conducted on November 17 in the First Methodist Church in Newark.

B. H. Pratt

BENJAMIN H. PRATT, retired Fisk executive, died suddenly November 11 in Milwaukee, Wis., on a visit there. Mr. Pratt's positions in the rubber industry follow: Pacific Coast manager, Fisk Rubber Co., Chicopee Falls, Mass.; general manager, Federal Rubber Co., Cudahy, Wis.; president and general manager, Badger Rubber Works, Milwaukee; vice-president and director, Fisk Rubber Co.; director, Tucker Rubber Corp., Buffalo, N. Y.

Interment occurred in Abington Mass., where the deceased was born 70 years ago.

Survivers include his wife and a nephew.

FINANCIAL

Unless otherwise stated, the results of operations of the following are after all charges, federal income and excess profits taxes and other deductions. Figures in most cases are subject to audit and final year-end adjustments.

Anaconda Wire & Cable Co., New York, N. Y. First nine months, 1941: net income, $2,146,580, equal to $5.09 each on 421,981 common shares, against $917,845, or $2.18 a share for the first three-quarters of 1940.

Baldwin Rubber Co., September quarter: net income, $101,068, or 32¢ each on 315,254 shares, against $81,476, or 26¢ each on 315,754 shares, in the third quarter last year.

Barber Asphalt Corp., Philadelphia, Pa. September quarter: net profit, $220,-861, equal to 56¢ each on 390,223 shares of capital stock, against $208,643, or 53¢ a share, in the June quarter, and a net loss of $217,475 in the September quarter last year. First nine months, 1941: net profit, $194,816, or 50¢ a share, against a net loss of $117,011 in the same months.

Columbian Carbon Co., New York, N. Y., and subsidiaries. First nine months, 1941: net profit, after $1,430,000 provision for federal taxes, $2,540,968, equal to $4.73 each on 537,406 capital shares, against $2,418,198, or $4.50 a share, after $600,000 provision for taxes, in the 1940 period.

Crown Cork & Seal Co., Baltimore, Md., and wholly owned domestic subsidiaries. Third quarter, 1941: net income, $1,256,036, or $2.18 each on 517,-625 common shares, against $952,511, or $1.59 a share, in the June quarter and $700,992, or $1.11 a share, in the September, 1940 quarter. First nine months, 1941: net profit, after depreciation, interest, amortization, and federal income and excess profits taxes, $2,613,-670, equal, after preferred dividends, to $4.32 a common share, contrasted with $2,082,708, or $3.29 each on 517,609 shares, in the same period last year; net sales, $35,259,567, against $26,501,742; federal income and excess profits taxes, $1,773,256, against $423,981.

Flintkote Co., New York, N. Y., and subsidiaries. Year ended October 4: net income, after $1,396,772 provision for taxes, $1,643,234, against $1,472,629, with $492,193 for taxes, in the preceding 52 weeks; net sales, $25,104,227, against $19,005,294.

General Cable Corp., New York, N. Y. Nine months to September 30: net income, $2,829,207, against $467,986, last year. Company has outstanding 150,000 shares of 7% preferred stock of $100 par value on which are dividend accumulations, as well as 306,689 Class A and 671,858 common shares.

General Electric Co., Schenectady, N. Y. First nine months, 1941: net profit, after tax provision of $82,000,000, $37,471,681, equal to $1.30 a common share, compared with $37,094,776, or $1.29 a share, after $26,900,000 for taxes, in the same period last year; net sales, $474,017,608, against $287,249,930 in the first nine months of 1940.

General Motors Corp., Detroit, Mich., and domestic and Canadian subsidiaries. Third quarter, 1941: net income, $42,-997,929, equal, after preferred dividend requirements to 94¢ a common share, against $15,597,030, or 31¢ a share, in the September quarter last year; net sales, $469,261,152, against $275,791,610. First nine months, 1941: net income, $161,175,834, or $3.56 a common share, against $129,172,490, or $2.83 a share, in the same months of 1940; net sales, totaled $1,818,352,012, against $1,195,-751,699.

L. H. Gilmer Co., Philadelphia, Pa. First half, 1941: net income, $154,083, or $1.86 a share on 82,824 shares, against $53,595, or 65¢ a share, last year; net sales, $1,196,251, against $713,655 in the first six months of 1940.

New Jersey Zinc Co., New York, N. Y. Third quarter, 1941: net profit, $2,519,-490, equal to $1.28 each on 1,963,264 capital shares, compared with $2,700,391, or $1.37 a share, in the June quarter and $1,796,195, or 91¢ a share in the September, 1940, quarter. First nine months, 1941: net profit, $7,033,390, or $3.58 a share, against $5,114,464, or $2.60 a share, in the corresponding period last year.

Skelly Oil Co., Kansas City, Mo. First nine months, 1941: net income, $4,027,895, equal to $4.10 each on the 981,349 common shares, against $2,251,-905, or $2.13 a common share, in the same period of 1940. September quarter: net income, $1,358,149, or $1.38 a common share, against $706,943, or 71¢ a share, in the third quarter last year.

United Carbon Co., Charleston, W. Va., and subsidiaries. First nine months, 1941: net profit after $885,000 provision for federal income and excess profits taxes, $1,214,551, equal to $3.05 each on 397,885 common shares, against $1,078,-707 or $2.71 a share last year when provision for income taxes totaled $404,000.

FROM OUR COLUMNS

50 Years Ago—December, 1891

The expected proportion of bicycle tires next year is 60 for pneumatics, 30 for cushions and 10 for solid. (p. 63)

Potato rubber, coming from Almadena, Africa, and resembling in every way the article from which it takes its name, is used to some extent by insulated wire men who buy it for 8¢ per pound. (p. 66)

There are merchantable in New York between 30 and 40 different sorts and grades of India-rubber. (p. 69)

Ceará rubber is called a "mule gum", the significance being that it is neither one thing nor the other, it being so deficient in elasticity as to cause some to argue that it is not rubber. (p. 69)

The INDIA RUBBER WORLD would like to see: an old-fashioned winter for the rubber-shoe trade; more rain for the clothing trade; a factory in the United States for making cut-sheet; a cheap light-weight substitute for litharge that could be used in colored goods as well as black; a white rubber shoddy equal to a black and sold for the same price. (p. 87)

25 Years Ago—December, 1916

Dustless lampblack may be made by mixing 60% of lampblack with 40% of petroleum or palm oil. The resultant product has the consistency of lard and may be compounded and milled with cleanliness. (p. 130.)

According to United States patent No. 1,196,256, isoprene may be purified by treating with sulphurous acid in the presence of hydrochloric acid which serves to facilitate the formation of a crystallizable sulfoxide for the recovery by heat of the pure hydrocarbon. (p. 131)

British patent No. 7,823, granted to H. P. M. A. Oliver in 1915, covers a process for vulcanization by ultra-violet rays. (p. 132)

Most of the crude rubber exported from Zanzibar is derived from the rubber vine, *Landolphia kirkii*, of which a considerable quantity grows wild in the forests of the Pemba district. Exports for 1915 amounted to 2,384 pounds. (p. 135)

A modified form of caterpillar tractor, designed for hauling heavy loads over soft ground, has a belt shod with 24 solid rubber blocks that increase the tractive power. (p. 141)

United States patent No. 1,200,070. Fernley H. Banbury, assignor to Birmingham Iron Foundry. The Banbury Masticator. This machine is of the Pointon type and provided with revolving blades which act in conjunction with stationary surfaces imparting a kneading action to the mass. (p. 144)

A second cargo of over 100 tons of rubber is being carried by the submarine *Deutschland* to Germany. The stock was purchased in the Dutch East Indies by parties not connected with the American rubber trade. (p. 154)

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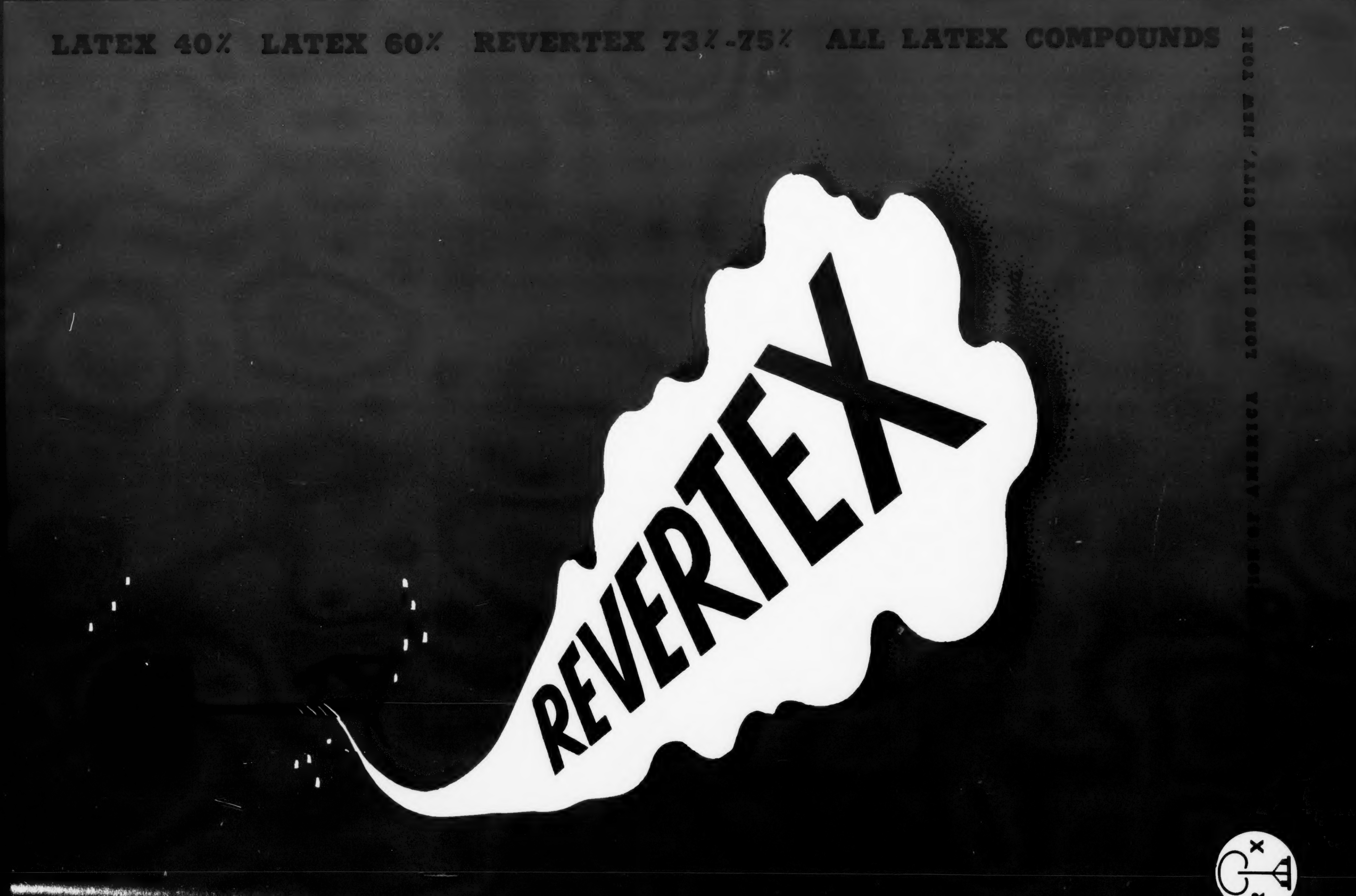
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EUROPE

GREAT BRITAIN

Structure of Synthetic Rubber[1]

Certain remarks made by P. Schidrowitz in his "Views and Reviews" concerning the implication of the term "synthetic" have led to an exchange of views between him and H. P. Stevens on the structure of synthetic rubber. Dr. Stevens had this to say:

"Do you think that the great difference in both physical and chemical behavior between natural and synthetic implies a radical difference in structure? If the synthetic consists of the commonly accepted chains $-CH_2-CH=C(CH_3)-CH_2-$ then natural must have some modified structure. I cannot think that length of chain or the association of chains, whether by primary valency links or van der Waals' forces, can account for the ready oxidizability and generally greater reactivity of the hydrocarbon from natural sources." He concludes, "I have read somewhere that optical relationships which exist between cellulose and its structural unit cellubiose (60% yield from cellulose) do not exist between natural rubber and isoprene. The small yield of the latter under the most favorable circumstances may not be without significance."

The above led Dr. Schidrowitz to consider the question of the derivation of rubber from isoprene and the identity of the natural hydrocarbon and those synthesized from isoprene. In this connection he quotes from an article by H. L. Fisher and R. H. Gerke[2] in which the statement was made that rubber hydrocarbon had not as yet been synthesized, though products very similar to it have been obtained by polymerization of isoprene. Dr. Schidrowitz goes on to say that a large number of hypotheses is available to account for the shortcomings of synthetic rubbers prepared from isoprene, which are perfectly consistent with the assumption that isoprene is nevertheless the structural rubber unit. However, his conclusion is:

"There is nothing which definitely suggests that we are wrong about the nature of the structural unit of rubber, and the discrepancies in regard to physical properties as between natural and 'isoprene-synthetic' are quite obviously explainable on the basis of the structure of the polymer or of the macro-

[1] *India Rubber J.*, Aug. 9, 1941, p. 4.
[2] "Chemistry and Structure of Rubber Hydrocarbon", in "Chemistry and Technology of Rubber", Davis and Blake, 1937, p. 122.

molecule, and so on, but so long as we are not able by synthesis to build up a hydrocarbon in all respects equal to that of the natural rubber, some doubt as to the nature of the structural unit seems at least permissible."

Suit for Shipwrecked Mariners

A Norwegian seaman has designed a suit which, it is claimed, will keep shipwrecked sailors warm in the water for many hours. It is a loose, two-piece garment consisting of a blouse having an attached hood, and trousers which end in closed feet on the style of a child's sleeping garment. Made of rubberized materials and weighing 2¾ pounds, the suit has impressed the Ministry of War Transport sufficiently to elicit an order for 100,000.

I.R.I. News

At the seventeenth annual general meeting of the London and District Section of the Institution of the Rubber Industry, September 8, the following committee was elected for 1941-42: S. Bailey, of Sussex Rubber Co., Ltd.; H. C. Baker and Geo. Martin, both of London Advisory Committee for Rubber Research; J. A. Bidmead and R. J. Tudor, India Rubber, Gutta Percha & Telegraph Works, Ltd.; C. H. Birkett and T. R. Dawson, Research Association of British Rubber Manufacturers; F. H. Cotton, Northern Polytechnic; E. G. Crowsley, British Rubber Publicity Association; H. A. Daynes, Siemens Bros. & Co., Ltd.; J. N. Dean, Telegraph Construction & Maintenance Co., Ltd.; M. M. Heywood, Firestone Tire & Rubber Co.; C. R. Pinnell, Wm. Warne & Co., Ltd.; E. Rhodes, British Rubber Producers' Research Association; H. J. Stern; S. D. Sutton, Veedip, Ltd., branch of St. Helens Cable & Rubber Co., Ltd.

After the meeting, the following papers were read: "The Case of Standardization of Reclaim" and "Aging of Reclaimed Rubber", both by W. E. Stafford, Rubber Regenerating Co., Ltd.; "Use of Reclaim", W. F. Hodson, Sussex; "Aging of Reclaim Stocks", B. A. Bleiweis, Henley's Telegraph Works Co., Ltd.; "Processing of Reclaim", J. Lewis, Rubber Improvement, Ltd.; "Methods of Reclaiming", Dr. Stern; "Fillers for Reclaim Stocks", J. Westhead, John Bull Rubber Co., Ltd.; "Accelerators and Reclaims", J. H. Carrington, Anchor Chemical Co., Ltd.; "Reclaimed Rubber: Its Selection and Use", Henry F. Palmer and Robert H. Crossley, Xylos Rubber Co., Akron, O., U. S. A.

On September 15 the London Section Committee elected the following officers for 1941-42: chairman, F. H. Cotton; vice chairman, Geo. Martin; secretary, H. C. Baker. The London Section Committee is attempting to arrange for meetings to be held throughout the winter, but should enemy action prevent this program, it will be transferred to the summer.

GERMANY

The problem of rendering the cable industry independent of foreign materials was one that occupied Germany long before the outbreak of the war and was peculiarly difficult to solve because all of the chief components, cotton, copper, and rubber, had to be imported. However, little by little the conversion to domestic materials was achieved, and cotton, copper, and rubber were used only in cables and wires for the export trade. But merely for a time, for, it is claimed, after it could be sufficiently demonstrated to foreign consumers that cables made from the new German materials were entirely satisfactory, foreign demand for these synthetic goods developed rapidly.

Data covering the business of 18 cable companies in 1939-40 show that at least in the early period of the present hostilities, the concerns were able to carry on as before. They booked net profits of 13,380,000 marks, against 12,430,000 marks in 1938-39, and paid wages and salaries of 75,960,000 marks,

against 69,420,000 marks; while taxes came to 41,480,000, against 44,230,000 marks. Of the 18 companies, three were unable to pay a dividend in either 1938-39 or the following year; the majority turned out between 8 to 12%. One company increased its dividend from 7 to 8%, and in another case there was a reduction to 12% from 15%.

FAR EAST

NETHERLANDS INDIA

Emulsifiers for Coagulating Latex[1]

When a certain company requested the Rubber Research Division of the West Java Experiment Station to test some samples of naphthenic acid emulsions for their usefulness as latex coagulants, it was found on investigation that coagulation was effected not by the naphthenic acids, but by the emulsifier (emulgator) used to emulsify the naphthenic acid. Analysis showed that the emulsifier consisted of sodium salts of one or more organic sulphonic acids.

Subsequently a large number of emulsifiers, chiefly soaps of sulphonic and fatty acids were investigated, including: Igepon, Vultamol, Turkey Red Oil, sulpho-oxy-stearic acid, sulphonated Lorol, Nekal B, Vulcastab N, Sulphonic Soap (B.P.M.) coconut-oil soap, Textile Finishing Oil (N.K.P.M.), Emulgator C, etc. With all these substances, except Igepon and Vultamol, coagulation of fresh latex was possible although surprisingly enough some of the substances are known as stabilizers for latex. The coagulating effect is restricted to a definite concentration range, above and below which the latex remains stable.

The fact was observed in these tests that coagulation always took place in practically neutral surroundings. Even the addition of small amounts of ammonia (up to about 20 milliliters 1% ammonia per liter of latex) or of other anti-coagulants, as soda and sodium sulphite in the concentrations prescribed for anti-coagulants, had no effect on coagulation. Naturally progressively higher concentrations of ammonia made coagulation more difficult and finally prevented it altogether. On the other hand the addition of small amounts of acid did not promote coagulation appreciably. Evidently then, this was a new kind of coagulation entirely different from the usual coagulation of latex with acids.

The mechanism of this new type of coagulation is explained as follows: Latex may be compared to an oil-in-water emulsion with the proteins taking the part of emulsifier. When a fatty acid is added to latex, the molecules of the former are adsorbed on the surface of the rubber globules and at the same time displace the proteins so that the latex, from being a protein-stabilized emulsion, has become a soap-stabilized emulsion. However the latex serum contains considerable amounts of magnesium and calcium ions in the presence of which soap-stabilized emulsions become unstable; hence the latex coagulates. But if the amount of emulsifier is increased, it will exentually predominate over these ions and stabilize the latex again. The concentration of Ca and especially of Mg ions in the latex is therefore an important factor in this type of coagulation.

Santobrite also behaves like an emulsifier, which is not surprising since the Mg and Ca salts of pentachlorophenol are insoluble, and the pentachlorophenol evidently is also strongly adsorbed on the rubber. This explains why at certain concentrations Santobrite is capable of coagulating

[1] "Emulgators (Emulsifiers) as Coagulants for Latex." G. E. van Gils. Communication No. 34, Rubber Research Division of the West Java Experiment Station, Buitenzorg, *Arch. Rubbercultuur,* Sept. 17, 1941, pp. 383-99.

latex and why the addition of ammonia is necessary. For ammonia precipitates the magnesium as magnesium ammonium phosphate, and the calcium probably as calcium phosphate. This is the primary function of the ammonia, and increasing the alkalinity is only secondary. Latex entirely free of Mg and Ca ions need not be alkaline to be preserved by Santobrite.

Small-scale tests indicate that emulsifiers can be used to coagulate latex in the preparation of sheet and crepe, though naturally only the cheaper and abundant emulsifiers like Turkey Red Oil and sulphonated minerals would come in for consideration. At present tests are being carried out by the Chemical Division of the West Java Experiment Station to determine their usefulness in estate practice. Comparative analyses of sheets prepared with formic acid and with Textile Finishing Oil showed that the latter were less plastic, had a lower nitrogen content, higher acetone and aqueous extract; but rate of cure, aging, and mechanical properties were substantially the same in both cases.

Considering some of the scientific aspects of the new findings, it is suggested that spontaneous coagulation of latex may be caused by the formation of free fatty acids from the lipins present in the latex; further that fatty acids probably play an important part in so-called pre-coagulation, which is explained thus: The yellow rubber globules contain larger amounts of lipoid substances and have a higher fatty acid content than the white globules. The latter have their surfaces entirely covered by adsorbed proteins when the calcium or magnesium content is increased, thus promoting soap coagulation, the latex is so altered that the yellow globules become unstable, while the white globules retain their stability. Tests show that the pre-coagulum actually does have the highest fatty acid content.

In conclusion it is pointed out that in the light of the present findings, the coagulation theories of De Vries, Van Harpen, and others will have to be revised.

Rubber from Buddings on Hybrid *Hevea Spruceana*

In connection with experiments being conducted in Sumatra, the General Experiment Station of the A.V.R.O.S. requested the Rubber Research Division of the West Java Experiment Station,[2] to test the properties of rubber obtained from buddings on *Hevea spruceana* hybrid stock before it was decided to broadcast the new method.

Hevea spruceana hybrid rubber proved darker than *Hevea brasiliensis* rubber, and it was advised to dilute the latex before coagulating and to add bisulphite in order to improve the color.

Chemical analyses indicated that the rubber and resin content of the new rubber is normal, but owing to the dilution before coagulation, the figures for ash content and acetone extract are lower.

In plasticity tests on the unmasticated rubber *spruceana* hybrid rubber usually proved somewhat harder than *brasiliensis* rubber. The former also showed a higher modulus after vulcanization; but this may prove an advantage for certain purposes. The rubber only has a higher modulus, however, when the tapping cut is at a distance of at least 20 centimeters from the union. Very little difference was noted in the rate of cure, tensile strength, aging, swelling (in xylol), between the two kinds of rubber.

Rubber Exports

Exports of estate rubber from Netherlands India continue to be short of the permissible quota. In August, 1941, exports by estates were 23,264 tons, against permissible of 27,827.6 tons. For the first eight months of 1941 estate rubber shipments totaled 187,082 tons; since the quota for this period was 222,620.7 tons, there occurred a shortage of 35,538.7 tons.

On the other hand, native exports have been slightly in excess. August exports were 29,622 tons, against permissible of 26,827 tons; while the total for January-August, 1941, at 217,577 tons, was 2,959 tons over the quota of 214,618 tons.

[2] "A Comparison of the Properties of Rubber Obtained from Buddings on Stock of *Hevea Spruceana* Hybrid and of *Hevea Brasiliensis*." G. J. van der Bie. Communication No. 31, Rubber Research Division of the West Java Experiment Station, Buitenzorg, *Arch. Rubbercultuur,* Sept. 17, 1941, pp. 271-93.

MALAYA

Quotas and Production

Because of the excessive internal assessment of estates in Malaya, the domestic rate of release for several quarters has been fixed at 2½% below the international quota, and it had at first been announced that Malaya's quota for the last quarter of 1941 would be reduced to 117½%. However it was later decided to restore the 2½% internal cut, and the domestic rate is now 120% for Malaya also. This change is not likely to make much difference in the amount of rubber produced. The replanting programs, especially of the last few years, when many thousands of acres were cut down, will play an important part in preventing the attainment of the desired quota. For though the areas replanted were for the most part the oldest and the poorest, in the aggregate they yielded a fair amount of rubber.

Production figures show that the total crop harvested during the first seven months of 1941 amounted to 344,491 tons; while the export allowance was 378,000 tons. However July output increased to 57,261 tons from 49,281 tons in June. The increase in large estates was comparatively small, but on estates of less than 100 acres production rose from 17,762 tons in June to 24,772 tons in July. There should be a continued increase in native outputs, for the new quota, which in practice amounts to all-out production, has had the immediate effect of rendering export rights practically worthless. In consequence those rubber growers, mainly owners of small holdings, who were content to earn an easy living selling their rights will have to produce rubber themselves.

Higher Priority Rating Desired

Malaya should have the highest possible priority rating on machinery and other supplies from the United States if production of tin and rubber for defense purposes is to be kept up, W. A. Fell, the head of the Department of Supply, Singapore, stated recently. He proposed to fly to Washington soon to explain how the inability to get American materials is interfering with defense works, and to point out what control measures are being adopted in the release of American goods for consumption.

Notes

Dunlop Malayan Estates, Ltd., Malacca, has announced the retirement of its chairman and managing director, G. Wiseman. His successor is R. B. Carey, who took up his duties as from August 1.

Hitherto the rubber compounds used for sealing cans by the local canning industry have been obtained from America exclusively. Recently two samples of similar compounds have been received here from England, and tests are said to have proved them to be as good as the American article; while the price is lower.

LIBERIA

Crude rubber has become the most important article of export from Liberia in the last few years. Figures covering all exports from the country in 1940 totaled $3,242,290, and of this crude rubber accounted for $2,645,573. In 1935, Liberia shipped only 2,143,456 pounds of rubber; in 1939, 12,028,769 pounds, and in 1940, 14,015,614 pounds. At the same time the requirements of the local rubber industry in machinery, motor trucks, and automobile accessories, chemicals, and iron and steel containers, constituted the chief imports. The growth of the rubber plantation industry here and its needs have been responsible for making Marshall, from which port the rubber plantations do their overseas business, the chief port instead of Monrovia.

CEYLON

Ceylon's net rubber exports for the first eight months of 1941 were only 58,075 tons, or 14,592 tons below the permissible exportable amount of 72,667 tons for the period. The quota for the whole of 1941 is 114,450 tons, so that 56,375 tons remain to be shipped in the last four months of the year. The question is how much of this amount it will actually be possible to produce and to ship within the above period. Meanwhile the Rubber Controller has circularized producers urging them to produce as much rubber as they can.

The Rubber Research Board is sponsoring fertilizer trials in various rubber planting districts to increase the yields of rubber. The experiments are to be confined to mature trees, preferably between 15 and 25 years old, and it is proposed to use sulphate of ammonia, rock phosphate, and muriate of potash as fertilizers.

The expenses of setting up the trial and half the cost of the fertilizers may be met by the Rubber Research Scheme.

INDIA

At a meeting of the India Chemical Society at Benares, H. K. Sen suggested that the government might very well investigate the possibilities of developing a plastics industry in India based on domestic natural products, chiefly shellac. Despite the huge output of synthetic resins in various countries, the demand for shellac has continued to increase steadily. About 11,000 tons are used for making gramophone records. At the Indian Lac Research Institute, he stated, experiments have been conducted with shellac modified by various synthetic resins, and it was found that when modified by formaldehyde, urea, melanine, etc., shellac can be worked by the hot molding method; shellac modified by formaldehyde and guanidine carbonate filled with jute waste can be injection molded. The heat resistance of modified shellac molded goods is around 90° C., which is satisfactory for ordinary purposes, but this can be raised to 120° C. and more by after baking.

THAILAND

The rubber industry in Thailand is receiving marked attention from Japan, press reports from Thailand indicate. At least ten representatives of Japanese rubber interests are now reported in the country buying up large quantities of rubber as well as many rubber plantations. Since the beginning of May, 1941, 10 rubber plantations have been acquired by Japanese, and at the end of the same month 2,000 tons of rubber were shipped by Japanese vessels. It is also said that certain Japanese shippers refuse to carry rubber from Thailand if it does not belong to members of the Japanese Rubber Assn.

PHILIPPINES

The demand for automobile tires and tubes has been increasing in the Philippines. During the first half of 1941, imports of automobile casings numbered 91,049, against 72,123 in the same period of 1940. Imports of tubes came to 79,531, against 52,457 in 1940. Practically all of these goods came from the United States. In 1940 Japan supplied a certain amount, but the 1941 shipments from this source were negligible. On the other hand Canada increased tire exports from 63 in the 1940 period to 1,147 in 1941.

Distributers' Tire Stocks

(Continued from page 269)

covered stocks in about 17,500 retail outlets. As indicated below, stocks of both casings and tubes dropped sharply to a new low.

OIL-COMPANY REPORTED STOCKS—1941

	July 1	October 1
Number of firms	32	32
Casings	1,061,309	772,086
Tubes	869,118	637,920
Index Numbers:		
Casings	116.8	85.0
Tubes	.....	70.2

Other Mass Distributers' Stocks

Reports were received from six tire manufacturers, operating 2,257 outlets, showing company-store stocks of 798,903 casings and 748,098 tubes. Casings declined 9.8%, but tube stocks increased 12.8%. Additional reports were received from ten other mass distributers, operating 2,242 retail outlets (and/or doing a mail-order business). Their tire stocks declined moderately, but tube stocks showed a slight increase, bringing total tube stocks held by mass-distributers to an unusually high figure.

MASS DISTRIBUTERS' REPORTED STOCKS—1941

	July 1	October 1
Number of firms	16	16
Stores	4,458	4,499
Casings	2,379,145	2,141,523
Tubes	1,904,298	2,014,453

The support of The Rubber Manufacturers Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the prompt cooperation of dealers, oil-company distributers, manufacturers, and other mass distributers in submitting data used in this report are gratefully acknowledged. We especially thank dealers who have submitted data and urge them to continue reporting regularly, as regularity is essential to trustworthy estimates of total dealer stocks. The survey is open to participation by any tire dealer.

Editor's Book Table

BOOK REVIEWS

"American Industry in the War." Bernard M. Baruch. Published by Prentice-Hall, Inc., New York, N. Y. 1941. Cloth, 6¼ by 9¼ inches, 498 pages. Indexed. Price $5.

A picture of war-time economic activity not dissimilar in its broad aspects to today's national defense program is presented in this volume which publishes in full the lengthy report submitted to President Wilson by Mr. Baruch describing the activities and accomplishments of the War Industries Board during the first World War. The book also publishes Mr. Baruch's program for total mobilization of the nation as presented to the War Policies Commission in 1931, as well as current material on priorities and price fixing.

The burden of Mr. Baruch's report on the war years of 1917-18 is devoted to commodities, and four pages discuss steps taken in respect to rubber and rubber goods. Detailed here are the problems of shipping and conservation and the restrictions imposed upon the rubber industry in the interest of this country's war effort. Heavy production curtailment of non-essential rubber goods, the report points out, was based on shipping problems and the estimated direct war requirements of 30,000 tons of crude rubber for 1918.

Today more than ever before our national security depends on industrial production. Thus the principles of industrial mobilization set forth in this book should demand the attention of all whose duties are connected with conserving vital raw materials or directing our defense production effort.

"The Rubber Industry." Josephine Perry. Published by Longmans, Green & Co., New York, N. Y. 1941. Cloth, 6¼ by 8¼ inches, 96 pages. Indexed. Price $1.50.

Written in a simple, straightforward style for boys and girls, this book, which is the fourth volume in the "America at Work" series, briefly recounts the growth and development of the rubber industry, highlighting the steps and processes which are used to transform the jungle product into finished manufactured articles. Attention is given to: the source of rubber; collecting latex on a typical plantation; preparing crude rubber for market; rubber substitutes; rubber manufacture, particularly the making of footwear and tires; and manufacturing articles from latex.

"Rubber's Goodyear: The Story of a Man's Perseverance." Adolph C. Regli. Published by Julian Messner, Inc., 8 W. 40th St., New York, N. Y. 1941. Cloth, 6½ by 9½ inches, 248 pages. Price $2.50.

The story of the perseverance of Charles Goodyear is graphically told here in a straightforward manner, effectively describing the series of misfortunes and triumphs which marked the inventor's life. Written in fictional form, the narrative reads smoothly, dealing with events in chronological order. Goodyear's attempts and ultimate triumph at vulcanizing, his commercial ventures, and Daniel Webster's spirited court defense of Goodyear in the celebrated Goodyear vs. Day case are fully related.

The three concluding chapters, "Pioneers in Rubber", "The Industry in America", and "New Uses for Rubber", describe briefly the sources of rubber, the history of the development of the rubber industry, the stature and attainments of the industry, and the uses and applications of rubber.

"The Chemical Formulary." Volume V. Edited by H. Bennett. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 1941. Cloth, 5½ by 8½ inches, 676 pages. Indexed. Price $6.

Following the general arrangement of preceding volumes, the fifth edition contains new and additional formulas gathered from many sources. A 25-page chapter on "Rubber, Resins, Plastics, Waxes" presents several rubber and latex formulas, together with suggestions on compounding.

"Fatigue of Workers and Its Relation to Industrial Production." The Committee on Work in Industry of the National Research Council. Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1941. Cloth, 6¼ by 9¼ inches, 165 pages. Price $2.50.

The effects of heat and high altitude, as representative of physical conditions of working, and the effects of pyschological factors encountered in individual workers upon the efficiency of workers is detailed and analyzed in this sociological report which contains authentic case histories. The Western Electric researches, in which six shop girls worked in a special test room from 1927 to 1933 as a means of determining causes and cures of labor fatigue, are described in detail. Other sections of the book treat of extra-time allowances and organization study.

"Wire and Wire Gauges." F. J. Camm. Published by Chemical Publishing Co., Inc., Brooklyn, N. Y. 1941. Cloth, 4¼ by 6¾ inches, 138 pages. Indexed. Price $2.50.

This pocket-size reference work presents tables of the various standard wire systems used in Great Britain and America. Separate treatment is accorded each wire gauge standard to avoid the possibility of confusing the various systems. A section on wire rope has also been included.

"American Cotton Handbook." G. R. Merrill, A. R. Macormac, and H. R. Mauersberger. Published by American Cotton Handbook Co., 303 Fifth Ave., New York, N. Y. First edition, 1941. Cloth, 5¼ by 7¾ inches, 1124 pages. Indexed. Price $4.80.

Up-to-date and practical information on every phase of the cotton industry—growing, processing, manufacturing, and merchandising—is included in this large reference volume which categorizes its data into 18 chapters written in simple and understandable English. The metamorphosis of the raw plantation product into yarns and fabrics which may be woven into fashionable merchandise is fully covered from the viewpoint of both the chemist and the engineer.

The opening chapters discuss the historical, economic, and statistical backgrounds of the American cotton industry, and succeeding chapters treat of the cultivation of the plant, the merchandising of the cotton product, and the technical processing required to produce marketable goods.

A glossary of cotton terms and a list of trade names of cotton dyes is included. The book has over 600 drawings, photographs, and charts.

NEW PUBLICATIONS

"Aerosol Wetting Agents." American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y. 77 pages. Thumb-indexed. This illustrated manual describes the types of wetting agents produced by the manufacturer, their solubilities, surface tension and interfacial tension characteristics, action in acids and alkalies, resistance to precipitation as indicated by calcium tolerance tests, and wetting power as indicated by the Draves test. There are also sections on foaming, emulsions, wetting and spreading, capillarity and penetration, etc. The section on applications includes a description of the use of wetting agents in the rubber industry, where they are said to increase the rate and degree of solution of rubber in mineral spirits; reduce the viscosity of chlorinated rubber solutions; aid in the wetting and grinding of aqueous dispersions for latex work; improve the wetting properties of latex, but with a lowering of the stability; find use with soap solutions as a mold lubricant; prevent milled sheets from adhering; and aid in wetting carbon black for use with ammonium caseinate in tire sidewall paints.

"List of Publications of the Department of Commerce." United States Department of Commerce, Washington, D. C. Available upon request from the Superintendent of Documents, Washington. 158 pages. Revised up to July, 1941, this booklet lists all of the available publications of the Department of Commerce and its branches.

"Rubber Mill Machinery." L. Albert & Son, Trenton, N. J. 147 pages. Here is a book on rubber machinery that is as much a reference work as it is a catalog. A description of the historical and technical background of each general class of machinery is given, together with specific data (dimensions, specifications, etc.) on many individual machines in each class. Although the firm's new presses and laboratory mills are presented, the bulk of the work is devoted to those machines made by other manufacturers and rebuilt by Albert. Among the types of equipment treated are: calenders, Banbury mixers, mills, tubing machines, vulcanizers, hydraulic presses, accumulators, pumps, instruments, fittings and accessories, laboratory equipment, molds, driers, and machinery used in conjunction with textile work. In addition, a 26-page section on engineering data presents tabular information on horsepower of shafting, gear weights and dimensions, pitch diameters of gears, horsepower and torque, etc. The book is sturdily bound in an attractive looseleaf folder and, because of its informative character, should find a welcome place in the rubber manufacturer's library.

"Rubber Testing Instruments." Catalog 9. American Instrument Co., Silver Spring, Md. This illustrated catalog describes equipment for making chemical and physical tests of rubber and rubber-like materials. Included in the write-ups are micrometers, extraction apparatus, grinders, the Bierer-Davis oxygen pressure chamber aging test, adhesion testing machines, compression set apparatus, viscometers, etc. Four pages are devoted to a description of the Aminco-Yerzley oscillograph. The apparatus listed makes tests according to standards of the American Society for Testing Materials, federal specifications, etc.

"Cotton Production in the United States." United States Department of Commerce, Washington, D. C. For sale by the Superintendent of Documents, Washington, 15¢. 37 pages. The statistical tables in this bulletin for the crop of 1940 include data on: cotton and linter production (1899 to 1940); production by states (1937 to 1940); cotton ginned by states (1937 to 1940); average gross weight of the several kinds of bales (1938 to 1939); number of ginneries in 1940; and cotton ginned by counties (1940).

"Inspected Fire Protection Equipment and Materials." July, 1941. Supplement to January, 1941, List. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 16 pages. This supplement contains only listings established subsequent to the publication of the January, 1941, List. Fire hose is included in the supplement.

"The Storage Battery Manufacturing Industry. 1941 Year Book." The Association of American Battery Manufacturers, Akron, O. 26 pages. Price 25¢. Among statistical information of particular interest to the storage battery industry, this booklet publishes data on car and truck registrations, battery production and exports, trends in motor transportation, and prices and consumption figures on raw materials used.

"Architect's Handbook for Resilient Tile Floors." David E. Kennedy, Inc., 58 Second Ave., Brooklyn, N. Y. 28 pages. Three types of resilient tile floors—asphalt, rubber, and cord—are considered in this booklet which presents data pertaining to cost, thicknesses, tile and border sizes, designs, etc., together with architects' specifications for tile and underfloors. Suggested kindergarten designs for rubber tile and architectural details of accessories used in connection with rubber tile flooring are included as well as specifications of sponge rubber kneeling pads for churches.

"Selection and Maintenance of Rubber Transmission Belts." Catalog Section 2150. The B. F. Goodrich Co., Akron, O. 12 pages. Formulae, arithmetical rules, diagrams, and tables designed to aid in the selection of a rubber transmission belt are covered in this publication. Rules are published, showing how to calculate the horsepower capacity, arc of contact, length of open drive endless belts, length of crossed endless belts, speed, belt joints, thicknesses, etc.

(*Continued on page* 318)

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DON'T BURY YOUR TIRES ALIVE. *Consumer Prices*, Oct. 20, 1941, pp. 10, 12-14.

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LIGHT AND ACCELERATED LIGHT AGING OF RUBBER, SYNTHETIC RUBBER, AND RUBBER SUBSTITUTES. T. A. Werkenthin, D. Richardson, R. F. Thornley, and R. E. Morris, *Rubber Age* (*N. Y.*), Nov., 1941, pp. 103-108. (To be continued.)

A MANOMETRIC TEST FOR OXYGEN ABSORPTION BY VULCANIZED RUBBER. R. H. Johnson, *Rubber Age* (*N. Y.*), Nov., 1941, pp. 109-113.

RUBBER HANDSET FOR LINEMAN. D. T. Eighmey, *Bell Labs. Record*, Nov., 1941, p. 76.

FACTORS INFLUENCING CREEP AND COLD FLOW OF PLASTICS. J. Delmonte and W. Dewar, *Bulletin* (*A.S.T.M.*), Oct., 1941, pp. 35-44.

COMPRESSION AND STRESS-DECAY IN RUBBER GASKETS. F. C. Thorn, *Bulletin* (*A.S.T.M.*), Oct., 1941, pp. 13-16.

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COOPERATION OF THE RUBBER INDUSTRY WITH DEFENSE. W. L. Finger, *Ind. Eng. Chem.*, Nov., 1941, pp. 1335-38.

PRESENT STATUS OF CRUDE RUBBER. E. G. Holt, *Ind. Eng. Chem.*, Nov., 1941, pp. 1339-41.

PRESENT STATUS OF SYNTHETIC RUBBER. E. R. Bridgwater, *Ind. Eng. Chem.*, Nov., 1941, pp. 1342-46.

PRESENT STATUS OF RUBBER CHEMICALS AND RECLAIMED RUBBER. J. P. Coe, *Ind. Eng. Chem.*, Nov., 1941, pp. 1347-51.

FRACTIONATION AND MOLECULAR WEIGHT OF RUBBER AND GUTTA PERCHA. A. R. Kemp and H. Peters, *Ind. Eng. Chem.*, Nov., 1941, pp. 1391-98.

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RUBBER TUBING IN THE MACHINE SHOP. *Rubber Age* (*London*), Oct., 1941, p. 196.

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Patents and Trade Marks

APPLICATION

United States

2,254,207. **Stage Lift** with Flexible Bellow for Wells. A. Boynton, San Antonio, Tex.
2,254,210. **Floor Covering** with Rubber Edge Binding. G. R. Cunnington, Grosse Pointe Park, assignor to National Automotive Fibres, Inc., Detroit, both in Mich.
2,254,280. **Rubber Outlet Strip** for Electrical Distribution System. H. Gottheimer, assignor to Bulldog Electric Products Co., both of Detroit, Mich.
2,254,329. **Replaceable Tread Tire.** T. J. Stephens, Lancaster, Pa.
2,254,330. **Electric Immersion Heater** Having a Flexible Heating Plate. T. Stiebel, Berlin-Tempelhof, Germany.
2,254,339. **Elastic Fabric.** J. R. Wylde and H. A. Swift, both of Spondon, England, assignors to Celanese Corp. of America, a corporation of Del.
2,254,343. **Windshield Cleaner** for a Curved Surface. W. E. Zierer, assignor to Chrysler Corp., both of Highland Park, Mich.
2,254,397. **Bearing Housing** with Rubber Attachment Block. R. R. Searles, assignor to Fafnir Bearing Co., New Britain, Conn.
2,254,406. **Quick Freezing Apparatus** Having Conforming Walls of Highly Extensible Resilient Material. W. M. Zarotschenzeff, Palisade, N. J., assignor to National Frosted Foods, Inc., New York, N. Y.
2,254,408. **Rubber Sanitary Pump Closure.** C. L. Allen, Portland, Ore.
2,254,453. **Container Closure** with Compressed Gasket. M. Scharmett, assignor to G. E. Scharmett, both of Ansonia, Conn.
2,254,465. **Resilient, Tubular Cow Tail Holder.** E. A. Wodrich, Alden, Minn.
2,254,466. **Waterproof High-Chair Pad.** L. Albert, New York, N. Y.
2,254,501. **Resilient Roller** with a Rubber Core. P. A. Solem, Rockford, Ill.
2,254,515. **Washing Machine** with Resilient Seal Lining the Opening. K. Clark, South Bend, Ind., assignor to Bendix Home Appliances, Inc., Detroit, Mich.
2,254,557. **Rubber Cap Pressure Retainer and Releasing Device.** E. H. Wittenberg, assignor to National Pressure Cooker Co., both of Eau Claire, Wis.
2,254,611. **Vacuum Cleaner Air Hose** Having an Insulating Coupling. G. E. Lofgren, Riverside, Conn., assignor to Electrolux Corp., Dover, Del.
2,254,683. **Eraser Attachment** for Typewriters. G. H. Hutaff, Jr., Wilmington, N. C.
2,254,685. **Rubber Overshoe.** W. C. Jackson, Rahway, N. J., assignor to Tingley Reliance Rubber Corp., a corporation of N. J.
2,254,699. **Lift** Having a Movable Cylinder and Plunger with Fluid-Tight Packing. L. F. Jaseph, assignor to Rotary Lift Co., both of Memphis, Tenn.
2,254,711. **Insole** Consisting Essentially of a Porous, Binder-Impregnated, Felted Fiber Base Whose Foot-Side Portion Contains a Halogenated, Thermoplastic Rubber Derivative. M. O. Schur and E. M. Archer, assignors to Brown Co., all of Berlin, N. H.
2,254,712. **Composite Rubber-Textile Thread, Yarn, and Fabric,** Comprising Lengths of Elastic Strand and of Highly Twisted and Sized Textile Thread, Productive of a Creped Thread on Desizing Thereby to Impart Limited Elasticity to the Yarn. T. L. Shepherd, London, England, assignor to Clark Thread Co., a corporation of New Jersey.
2,254,732. **Tone Arm** Having a Rubber Cushioning Member. R. Dally, assignor to Webster Electric Co., both of Racine, Wis.
2,254,778. **Tire Construction.** C. G. Hoover, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,254,781. **Shock Absorber** Having a Block of Elastic Material. T. G. Rabbitt, assignor to Sun Oil Co., both of Philadelphia, Pa.
2,254,783. **Insulator.** E. F. Riesing, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,254,815. **Venting Closure** with Resilient Sealing Gasket. H. A. Barnby and J. M. Wheaton, both of Toledo, O.
2,254,830. **Bath Tub and Shower Mat** of Elastic Fabric. N. F. Schloss, New York, N. Y.
2,254,854. **Anaesthetic Administering Device.** H. V. O'Connell, New York, N. Y.
2,254,874. **Eraser.** R. G. Roesch, assignor to Eraser Co., Inc., both of Syracuse, N. Y.
2,254,905. **Exhaust Machine** Having a Rubber Conduit, and Method of Protecting Exhaust Systems. D. Mullan, Kearny, N. J., assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
2,254,915. **Surgical Dressing.** L. T. Sawyer, Fitchburgh, Mass.
2,254,978. **Service Insulator** with Yieldable Member. G. C. Price, Parkersburg, W. Va., assignor to Porcelain Products, Inc., Findlay, O.
2,254,982. **Knit Stocking** with a Strain-Absorbing Band Containing Elastic Yarn. H. B. Snader, Temple, assignor to Vanity Fair Silk Mills, Reading, both in Pa.
2,254,988. **Marine Light** with Moisture-Proof Sealing Gasket. G. W. Adams, Norfolk, Va.
2,255,031. **Hosiery Welts** Incorporating Endless Rubber Bands. G. Vogel, Siegmar-Schonau, Saxony, Germany.
2,255,098. **Eyelash Curler** with Rubber Compression Strip. H. Bernstein, Brooklyn, N. Y.
2,255,119. **Nozzle.** J. E. Kennedy, assignor to Kennedy-Van Saun Mfg. & Engineering Corp., both of New York, N. Y.
2,255,165. **Wringer.** J. V. Gunn, Okmulgee, assignor of ½ to A. Rego, Tulsa, both in Okla.
2,255,174. **Skirt Marker** Utilizing a Rubber Bulb. I. Levin, Brooklyn, N. Y.
2,255,177. **Heel** with Resilient Cushioning Strip. H. S. Lyness, Lynn, Mass., assignor to United Shoe Machinery Corp., Flemington, N. J.
2,255,239. **Pump Volute Liner** with Rubber Covered Core. F. B. Allen, Lower Merion Township, assignor to Allen-Sherman-Hoff Co., Philadelphia, both in Pa.
2,255,323. **Knitting and Incorporating Elastic Yarn.** J. Markowitz, assignor to Pennant Knitting Mills, Inc., both of Brooklyn, N. Y.
2,255,376. **Electrical Heating Unit and Pad** Comprising a Fabric Sheet Containing Rubber and Sufficient Electrically Conducting Carbon Black to Impart Current Conducting and Heating Properties to the Fabric. A. W. Bull, Grosse Pointe, and G. G. Havens, Detroit, both in Mich., assignors to United States Rubber Co., New York, N. Y.
2,255,393. **Windshield Cleaner.** C. L. Osborn, Cheyenne, Wyo.
2,255,412. **Windshield Heater** Including a Resilient Sealing Strip. J. H. Cohen, Bridgeport, Conn.
2,255,504. **Laminated Packing.** W. G. Current, assignor to Garlock Packing Co., both of Palmyra, N. Y.
2,255,554. **Upholstery Structure** Using Latex for Bonding. J. C. Gordon, assignor to Allen Industries, Inc., both of Detroit, Mich.
2,255,555. **Upholstery Unit** with Coating of Latex Enveloping a Laminated Fibrous Structure, with Latex Also Bonding the Plies. J. C. Gordon, assignor to Allen Industries, Inc., both of Detroit, Mich.
2,255,613. **Shaft Housing Packing.** E. W. Fisher, Jr., and W. H. Gudinas, assignors to Garlock Packing Co., all of Palmyra, N. Y.
2,255,684. **Massaging Device** Utilizing Suction Cups. G. A. Smith, Baltimore, Md.
2,255,708. **Sleeping Cap and Net** Shirred with Elastic Thread. G. A. Laughton, Birmingham, England.
2,255,713. **Garment Closure.** P. H. Robbins, assignor to Poirette Corsets, Inc., both of New York, N. Y.
2,255,717. **Flexible Connection** for Engine Drive Shaft. J. M. Tyler, West Hartford, assignor to United Aircraft Corp., East Hartford, both in Conn.
2,255,725. **Knock-Out Vehicle Window Setting** with Rubber Channel Strip. J. E. Trescher, Guilford College, N. C., assignor to Continental Rubber Works, Erie, Pa.
2,255,740. **Charge Separating and Rolling Means** for Cigar Bunch Machines with Compacting Plunger Having a Sponge Rubber Facing. J. F. Halstead, Brooklyn, N. Y., assignor to International Cigar Machinery Co., a corporation of N. J.
2,255,749. **Athletic Game Ball.** M. B. Reach, Springfield, Mass.
2,255,813. **Steering Wheel.** H. C. Robbins and C. F. Hilldring, both of Akron, O., assignors to American Hard Rubber Co., New York, N. Y.
2,255,823. **Coat** with Elastic-Shirred Rear Waistline. A. Silverstein, New York, N. Y.
2,255,832. **Impregnated Electric Cable.** H. E. Thompson, Dobbs Ferry, assignor to Anaconda Wire & Cable Co., New York, both in N. Y.
2,255,833. **Pocket Syringe.** B. L. Taylor, United States Navy.
2,255,859. **Method of Cleaning and Drying Strip or Sheets** Utilizing Squeegee Rolls. W. M. Quigley, West View, Pa., assignor to Carnegie-Illinois Steel Corp., a corporation of N. J.
2,255,871. **Rubber Insulated Electrical Conductor** Coated with a Regenerated Cellulose Separator Strip. E. Freydberg, New York, J. F. McCullough, New Rochelle, and R. D. Coldwell, assignors to Freydberg Bros., Inc., both of New York, all in N. Y.
2,255,884. **Rubber V-Belt** Characterized by the Absence of Reenforcing Elements Except a Plurality of Separate Cords Located Adjacent the Outer Surface of the Belt. T. L. Hedgpeth, Oak Park, assignor to Duro Metal Products Co., Chicago, both in Ill.
2,255,908. **Resilient Motor Support and Belt-Tightening Apparatus.** E. L. Anderson, assignor to American Blower Corp., both of Detroit, Mich.
2,255,931. **Man's Underwear** with Elastic Waistband. G. M. Kloster, assignor to Utica Knitting Co., both of Utica, N. Y.
2,255,932. **Tire Valve.** H. T. Kraft, Akron, and W. C. McCoy, Shaker Heights, O., assignors, by mesne assignments, to Jenkins Bros., Bridgeport, Conn.
2,255,939. **Resilient Support** for a Screen Cloth. G. A. and G. Overstrom both of Los Angeles, and C. Overstrom, Altadena, both in Calif.
2,255,994. **Tire and Tread Construction.** A. A. Bush, deceased, late of Akron, O., by Firestone Park Trust & Savings Bank, executor, assignor to Firestone Tire & Rubber Co., both of Akron, O.
2,256,105. **Battery Plate** with Separators Coated with Plasticized Gamma Polyvinyl Chloride. M. Shank, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,256,108. **Transferring Light-Polarizing Films** (Vinyl Compound) from One Support to Another. R. P. Blake, Cambridge, Mass., assignor, by mesne assignments, to Polaroid Corp., Dover, Del.
2,256,145. **Filter** Having a Rubber Packing Ring. A. Hock, Cincinnati, O.
2,256,155. **Belt Fastener.** C. F. Smith, Cuyahoga Falls, O., assignor to Wingfoot Corp., Wilmington, Del.
2,256,156. **Packaging** Using a Thin Sheet of Rubber Hydrochloride Film. J. E. Snyder, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.
2,256,162. **Wringer.** W. L. Kauffman, II, assignor to Lovell Mfg. Co., both of Erie, Pa.
2,256,200. **Watchcase** with a Cushion Rubber Ring. D. J. Heilman, Madison, Wis.
2,256,276. **Draft Excluding Means.** T. J. R. Bright, Coventry, England.
2,256,321. **Commutator** Having a Molded Body of Insulating Material. R. G. McCusker, assignor to Heinze Electric Corp., both of Lowell, Mass.
2,256,343. **Machinery Packing.** C. R. Hubbard, assignor to Garlock Packing Co., both of Palmyra, N. Y.
2,256,363. **Machine,** Including a Rubber Ring Having a Conical Surface, for Enameling Shoulders of Collapsible Tubes. G. W. Temple, New York, assignor to Victor Metal Products Corp., Brooklyn, both in N. Y.
2,256,410. **Abdominal Body Brace.** P. H. Robbins, assignor to Poirette Corsets, Inc., both of New York, N. Y.
2,256,431. **Expansible Brake Structure.** W. H. Hunter and C. E. Snyder, both of Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.
2,256,477. **Window Wiper.** J. H. Herzog, Brooklyn, assignor to Sleetex Co., Inc., New York, both in N. Y.
2,256,489. **Armored Electrical Conductor Structure.** C. F. Nazett, Boston, and E. C. Hardy, Somerville, both in Mass.
2,256,643. **Footwear.** C. E. Hosker, Watertown, Mass., assignor to B. F. Goodrich Co., New York, N. Y.
2,256,646. **Molded Composition Friction Body** Comprising Fibers Bonded with an Organic Bond and Containing Widely Separated Discrete Rubbery Coarse Particles Dispersed through the Body Mass; the Particles Being Insoluble in the Bond, Visibly Distinct Therein, and Consisting of a Reaction or Polymerization Product of an Anacardic Acid Material. J. N. Kuzmick, Clifton, and A. Whitelaw, assignors to Raybestos-Manhattan, Inc., both of Passaic, all in N. J.
2,256,647. **Rubber Bearing.** A. B. Merrill, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,256,650. **Egg Beater Scraper and Cleaner** Having a Flexible Blade. E. B. Reid, Portland, Oreg., and K. Davies, Cle Elum, Wash.
2,256,656. **Blood Transfusion Device.** J. E. B. Swabacker, Chicago, Ill.
2,256,683. **Applicator Bandage.** J. L. Mikesell, Pampa, Tex.
2,256,690. **Stocking** with Elastic Yarn Selvage. W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.
2,256,691. **Stocking Top** Having an Elastic Yarn Selvage. W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.
2,256,700. **Method and Apparatus for Cleaning Fruit** Using a Plurality of Resiliently Flexible Plunger Members. J. A. Armstrong, Los Angeles, Calif.
2,256,701. **Lug Strap Manufacture.** H. M. Bacon, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.
2,256,709. **Clutch Driven Plate.** H. D. Geyer, Dayton, O., assignor to General Motors Corp., Detroit, Mich.
2,256,752. **Resilient Mounting.** C. Saurer, as-

signor to Firestone Tire & Rubber Co., both of Akron, O.

2,256,756. **Power Transmission Belt.** A. S. Brown, assignor to A. S. Brown Mfg. Co., both of Tilton, N. H.

2,256,820. **Anode Structure** Comprising an Elongated Metal Member Encased in a Rubber Covering. G. W. Veale, Grass Lake, Mich., assignor to Eaton Mfg. Co., Cleveland, O.

2,256,835. **Oleopneumatic Device.** J. Mercier, Neuilly-sur-Seine, France.

2,256,858. **Thread Guide Driving Arrangement** Having Rubber Hinge Connections for Textile Machines. O. Bochmann, Remscheid-Lennep, Rhineland, assignor to Barmer Maschinenfabrik A. G., Wuppertal-Oberbarmen, both in Germany.

2,256,900. **Shoe Sole Cushion Member** of Fabric and Sponge Rubber Layers. T. Gutwein, Dayton, assignor of 1/3 to T. C. Dye, Oakwood, both in O.

2,256,979. **Pew Kneeler Cover.** J. C. Jones, Springfield Gardens, N. Y.

2,256,984. **Locomotive Boiler Spacer Support** with a Rubber Cushioning Member. W. W. Lemen, Glendale, Calif., and D. G. Cunningham, Salt Lake City, Utah.

2,257,025. **Rubber-Faced Roller.** F. Schuster, Chemnitz, Germany.

2,257,026. **Shoe Sole** of Synthetic Resin-Impregnated Fibrous Material. S. Szauer, Budapest, Hungary.

2,257,061. **Sanding Wheel Head** with Circular Cushioning Member. F. H. Morris, assignor to Pearson Sanding Machine Co., both of High Point, N. C.

2,257,063. **Blasting Plug** with Cylindrical Rubber Body. H. M. Mossman, New York, N. Y., and W. Steward, assignors to Heitzman Safety Blasting Plug Corp., both of Shamokin, Pa.

2,257,185. **Traction Lug Device** for Wheels Having a Center, a Rim, and a Tire. C. R. Nelson, Dysart, Iowa.

2,257,329. **Dental Therapeutic Apparatus** Including Body of Heat Insulating Rubber. V. E. Britt, Oakland, assignor of 1/4 to A. F. Edwards, San Leandro, and 1/4 to R. W. Claire, Berkeley, all in Calif.

2,257,559. **Chuck Key Holder** Having a Rubber Member. F. O. Albertson, assignor to Albertson & Co., Inc., both of Sioux City, Iowa.

2,257,571. **Vehicle Spring Suspension Means** with Rubber-Like Interconnecting Means of Annular Form. K. Rabe, Stuttgart, assignor to Dr. ing. h. c. F. Porsche, K.-G., Stuttgart-Zuffenhausen, both in Germany.

2,257,589. **Screw-Threaded Fastener** Having Its Thread Surface Coated with a Film of Non-Adherent Rubber. C. E. S. Place, assignor to C. L. Brackett, both of Detroit, Mich.

2,257,604. **Tire Casing** Having Embedded Therein and Being Reenforced Solely by a Plurality of Layers of Metallic Wire Elements Extending from One Bead Diagonally through the Sidewalls and Tread to the Other Bead; Each Wire Element Comprises a Section of Flat Wire Braid Made up of Wires Extending Back and Forth Diagonally across the Braid and over and under Each Other Continuously throughout the Section. C. C. Harrah, assignor to National Standard Co., both of Niles, Mich.

2,257,610. **Motor Control and Brake Mechanism** with Inflatable Brake Shoe. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,257,646. **Tire Casing** Having Embedded Therein a Number of Layers of Tensile Elements Comprising an Elongated Yielding Core of Small Diameter and a Plurality of Strands of Smaller Diameter Braided around the Core, with Some of the Strands Metal Wires. R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,257,647. **Tire Casing** Having Embedded Therein a Plurality of Layers of Narrow Flat Tapes Made up of Strands Braided together; Some of the Strands are Non-Metallic Yielding Materials and the Others Metal Wires. R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,257,718. **Knitted Fabric** Incorporating Elastic Yarn. W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,257,719. **Hosiery** with Elasticized Knee-Section. W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,257,789. **Windshield Wiper Blade.** A. C. de Hoffmann, New York, N. Y.

2,257,804. **Joint** with Opposing Flat Plates and Rubber between. H. C. Lord, assignor to Lord Mfg. Co., both of Erie, Pa.

2,257,848. **Hip Rest Cushion** with Rubberized Fabric Cover. E. M. Larkin, Lewiston, Idaho.

2,257,864. **Surfacing Shoe Finishing Wheel** Comprising an Annular Body of Resilient Rubber with Integral Rubber Ribs. J. J. Sheehan, Lynn, Mass.

2,257,901 and 2,257,902. **Rubber Overshoe.** J. de Noronha, New York, N. Y., assignor to De Noronha Rubber Products Corp., New Brunswick, N. J.

2,257,911. **Reenforcing Natural and Artificial Sponges** without Rendering Them Impervious to Water, by Impregnating the Sponge with a Dispersion of Rubber. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,257,912. **Drum-Type Clutch** with Rubber Treaded Expansible Shoe. H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

2,257,913. **Suspension System** Having a Pair of End Members in an Annular Casing of Rubber Composition Extending between Them. H. F. Maranville, assignor to General Tire & Rubber Co., both of Akron, O.

2,257,923. **Tie Plate and Rail Support.** P. Verplanck, Akron, O.

2,258,031. **Tire Casing** Having Embedded Therein a Plurality of Layers of Flat Narrow Tapes Made up of Strands Braided together; a Part of the Strands Are Formed by a Plurality of Metal Wires Twisted together. R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,258,040. **Cushion Seal Bearing.** F. M. Young, Racine, Wis.

2,258,067. **Vehicle Leaf Spring Mounting** with Rubber Bushing. C. R. Paton, Birmingham, assignor to Packard Motor Car Co., Detroit, both in Mich.

2,258,268. **Squeeze Roll** Formed from a Sulphurized Polymeric Material Including Isobutylene and Butadiene Produced from a Mixture of 70 to 90 Parts of Isobutylene with 30 to 10 Parts of Butadiene, Respectively, Polymerized at Temperatures between —50 and —150° C. by Applying to the Mixture Aluminum Chloride Dissolved in Ethyl Chloride. W. J. Sparks, Cranford, and R. M. Thomas, Union, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,258,322. **Antiskid Shoe Device.** L. K. Frolich, Louisville, Neb.

2,258,371. **Rotary Piston Machine** with Rotor of Yieldable Material. K. Wernert, Mulheim-on-the-Ruhr, Germany.

2,258,419. **Rubber Heel.** D. Piciulo, Jackson Heights, N. Y.

2,258,420. **Self-Lubricating Bearing** with an Elastic Plastic Sleeve. E. H. Piron, New York, N. Y., assignor to Transit Research Corp., a corporation of N. Y.

2,258,434. **Anchoring Thermoplastic Coatings** upon Vegetable Parchment Sheeting by Coating the Sheet with a Bonding Material Comprising Essentially Rosin Size and Anchoring to the Bonding Material a Composition of Wax and Rubber. A. Abrams, G. W. Forcey, and G. J. Brabender, all of Wausau, and W. H. Graebner, Neenah, assignors to Marathon Paper Mills Co., Rothschild, all in Wis.

Dominion of Canada

399,459. **Container Sealing Method** Utilizing a Solid Rubber Plug. American Can Co., New York, assignee of J. M. Hothersall, Brooklyn, both in N. Y., U. S. A.

399,470. **Engine Starter Drive** with Cylindrical Elastic Transmission Member. Bendix Aviation Corp., South Bend, Ind., assignee of Y. Sekella, Elmira Heights, N. Y., both in the U. S. A.

399,495. **Tire** with Low Growth Characteristics Utilizing Rayon. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of M. Castricum, Grosse Pointe, and F. C. Kennedy, Detroit, co-inventors, both in Mich., U. S. A.

399,508. **Fender Shield** with Soft Edging Strip. Houdaille-Hershey Corp., assignee of G. W. Schatzman, both of Detroit, Mich., U. S. A.

399,554. **Battery Filling and Venting Device.** Firestone Tire & Rubber Co., assignee of L. E. Olcott, both of Akron, O., U. S. A.

399,555. **Dual Wheel Assembly.** C. S. Ash, Milford, Mich., U. S. A.

399,556. **Braking Means** for Dual Wheels. C. S. Ash, Milford, Mich., U. S. A.

399,560. **Slip** with Elastic Fabric Panel. E. Cadous, New York, N. Y., U. S. A.

399,581. **Foundation Garment.** P. H. Robbins, New York, N. Y., U. S. A.

399,603. **Hair Curler** Having a Rubber Part. Apex Products, Ltd., Toronto, Ont., assignee of W. Huppert, New York, N. Y., U. S. A.

399,653. **Resilient Mounting.** Firestone Tire & Rubber Co., assignee of C. Saurer, both of Akron, O., U. S. A.

399,661. **Respirator Mask.** B. F. Goodrich Co., New York, N. Y., assignee of C. W. Leguillon, Akron, O., both in the U. S. A.

399,675. **Sealed Package** Utilizing Wax-Rubber Coated Sheets. Marathon Paper Mills Co., Rothschild, assignee of M. H. Smith, Neenah, both in Wis., and R. A. Nash, Bronxville, N. Y., co-inventors, all in the U. S. A.

399,747. **Therapeutic Vibrator.** W. L. Wettlaufer, Buffalo, New York, U. S. A.

399,792. **Shovel** Comprising a Metal Scoop and a Layer of Rubber Bonded to a Work-Engaging Face Thereof. R. A. Smith, Mahwah, N. J., U. S. A.

399,807. **Engine Starter Gearing** Having an Elastically Compressible Thrust Block. Bendix Aviation Corp., South Bend, Ind., assignee of Y. Sekella, Elmira Heights, N. Y., both in the U. S. A.

399,855. **Tractor Wheel Cleat** with Rubber Block Parts. Roadless Tractor, Ltd., Hounslow, Middlesex, assignee of R. Bawden, Molten, Devonshire, both in England.

399,874. **Pressure Cooker** with a Relief Device Having a Synthetic Rubber Element Closing the Aperture. Vischer Products Co., Chicago, assignee of A. Vischer, Jr., Park Ridge, both in Ill., U. S. A.

399,881. **Hydrometer Syringe.** Willard Storage Battery Co., assignee of C. J. Dunzweiler, both of Cleveland, O., U. S. A.

399,884. **Apparatus Utilizing a Rubber Mat** for Recovering Metal Contents from Ore Pulp. J. Hedley, North Wembly, Middlesex, inventor, and J. L. Spong, London, assignee of 1/2 of the interest, both in England.

United Kingdom

538,686. **Tractor or Other Vehicle Wheels.** Soc. Anon. Des Pneumatiques Dunlop.

538,792. **Composite Fabrics** for Balloon Envelopes. W. F. Smith, J. R. S. Waring, and Imperial Chemical Industries, Ltd.

539,053. **Hose and Coupling Structures.** United States Rubber Co.

539,098. **Clothes Wringers.** British Thomson-Houston Co., Ltd.

539,109. **Electric Cables.** Liverpool Electric Cable Co., Ltd., and J. T. Frost.

539,134. **Electric Cables.** Standard Oil Development Co.

539,243. **Surgical Elastic Bandages.** T. Spitzner.

539,374. **Boots and Shoes.** H. J. Fitzpatrick, (Bata Akciova Spolecnost).

PROCESS

United States

2,256,631. **Recapping Tires Process** Using Kettle Cure. R. E. Steele, Pomona, Calif.

2,256,863. **Rubber Heel and Sole, and Wear Plug Therefore.** A. A. Esterson, assignor to Cat's Paw Rubber Co., Inc., both of Baltimore, Md.

2,256,897. **Insulating Joint** for Electric Cable Sheaths Consisting of a Sleeve-Like Member of Polystyrene. W. F. Davidson, Port Washington, N. Y., and E. R. Thomas, Palisades Park, N. J., assignors to Consolidated Edison Co. of New York, Inc., New York, N. Y.

2,257,355. **Attaching Couplings to Hose** Made of Highly Polymerized Vinyl Composition. H. Vohrer, Berlin, Germany, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,258,026. **Forming an Abrasive Article** by Moistening Abrasive Particles with a Rubber Cement (Rubber, Mineral Rubber, and Gasoline), Stirring in a Mixture of Magnesium and Zinc Oxides to Coat the Particle Surfaces, Admixing a Vulcanizable Partially Prevulcanized Latex Bonding Material (Latex, Butyl Zimate, Sulphur, and Ammonium Sulphate), Allowing the Mixture to Stand at an Elevated Temperature to Thicken the Bonding Material, Admixing Hard-Rubber Dust, and Then Pressing, Drying and Vulcanizing the Mass. H. B. Morris, Somerset, Mass., assignor to Firestone Tire & Rubber Co., Akron, O.

2,258,238. **Composite Floor Mats** Consisting of a Sheet of Vulcanizable Material and a Pile Fabric, without Matting the Pile When Pressure Is Applied to the Fabric and Sheet Stock. D. F. Collins, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

2,258,331. **Golf Balls** Having a Central Core of Metallic Mercury Contained in a Flexible Hollow Member Surrounded by Layers of Rubber, a Mixture of Granulated Cork, Rubber, and Kauri Resin, a Mixture of Rubber Granulated Nickel, and Kauri Resin, Strip Rubber Wound under Tension, and an Outer Cover of Gutta Percha. E. Miller, Brussels, Belgium.

2,258,332. **Golf Ball** Having a Solid, Substantially Homogeneous Molded Core Proper Consisting of a Mixture of Rubber, Granulated Pure Elemental Nickel, and Kauri Resin. E. Miller, Brussels, Belgium.

2,258,333. **Golf Ball** Having a Solid, Substantially Homogeneous Molded Core Proper Consisting of a Mixture of Granulated Cork, Rubber, and Kauri Resin. E. Miller, Brussels, Belgium.

Dominion of Canada

399,097. **Rubber Coating Process** for Fabrics Utilizing a Heat-Sensitive Fluid Latex Composition. International Latex Processes, Ltd., St. Peter's Port, Channel Islands, assignee of H. C. Tingey, Nutley, N. J., U. S. A.

United Kingdom

538,749. **Insulating and Covering Electrical Conductors.** Okonite Co.

538,809. **Spherical Inflatable Athletic Game Ball** M. B. Reach.

MACHINERY

United States

21,906. (Reissue.) **Plastic Extrusion Molding Press.** V. S. Shaw, Cardington, O., assignor to Hydraulic Press Corp., Inc., Wilmington, Del.

2,257,248. **Tire Groover.** L. T. Taylor, Maumee, O.

2,258,025. **Molding Apparatus** for Forming a Tubular Strip of Rubber from Latex. H. B. Morris, Cuyahoga Falls, and J. N. Street, assignors to Firestone Tire & Rubber Co., both of Akron, O.

2,258,027. **Tire Groover.** W. Mossback and J. A. Menard, assignors to Timesaver Products Co., all of Seattle, Wash.

2,258,350. **Strip Supply Unit** for Tire Building Machines. H. C. Bostwick and E. C. Kastner, assignors to Akron Standard Mold Co., all of Akron, O.

2,258,378. **Cutter** to Prepare Pneumatic Tires for Retreading. N. T. J. Collmann, Lubeck, Germany.

Dominion of Canada

399,585. **Rubber Thread Apparatus.** A. N. Spanel, Rochester, N. Y., U. S. A.

399,860. **Repair Vulcanizer** Having a Fuel-Containing Platen. Shaler Co., Waupun, assignee of M. L. Reibold, Beaver Dam, both in Wis.

United Kingdom

539,037. **Skiving Machines.** British United Shoe Machinery Co., Ltd., (United Shoe Machinery Corp.).

539,067. **Film-Casting Surfaces.** Wingfoot Corp.

539,199. **Skiving Machines.** British United Shoe Machinery Co., Ltd., S. W. Potter, and J. H. Perkins.

CHEMICAL

United States

21,904. (Reissue.) **Laminated Light Polarizer** Utilizing a Layer of Plasticized Polymerized Vinyl Resin. E. H. Land, Boston, Mass., assignor, by mesne assignments, to Polaroid Corp., Dover, Del.

2,256,483. **A Polymer of Ethylene in Porous Spongy Form,** the Polymer of Ethylene Corresponding in Composition to $(CH_2)x$ and Showing by X-Ray Diffraction Analysis a Crystalline Structure. F. L. Johnston, Claymont, assignor to E. I. du Pont de Nemours & Co., Wilmington, both in Del.

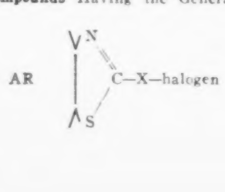
2,256,625. **Heat Stabilized Vinyl Resin.** W. M. Quattlebaum, Jr., Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp.

2,257,076. **Dyeing Polyvinyl Halide-Acetate Co-Polymer Fibers and Fabrics.** F. E. Petke, Bound Brook, N. J., and A. F. Klein, Philadelphia, Pa., assignors to American Cyanamid Co., New York, N. Y.

2,257,083. **Plastic Composition of Matter** Comprising Aqueous Dispersion of Rubber, a Filler of Friable Particles Containing Mainly Expanded Mica and Bentonite in Amount by Volume Equal Substantially to the Volume of Aqueous Rubber Dispersion, the Proportion of Mica to Bentonite about 20 to 1, and a Coagulant for the Rubber Dispersion. M. R. Buffington, Millburn, N. J., assignor to Rubber Associates, Inc., a corporation of N. Y.

2,257,607. **Process for Producing an Aqueous Dispersion of a Sulphur-Containing Organic Condensation Product of High Molecular Weight,** Which Comprises Forming an Aqueous Dispersion by Condensing an Inorganic Water-Soluble Polysulphide in an Aqueous Reaction Medium with an Organic Compound Having a Substituent Joined to Each of Two Different Carbon Atoms, Which Substituent Is Split off during the Reaction, in the Presence of an Inorganic Dispersing Agent (Oxide Hydroxide or Carbonate of Magnesium, Calcium or Barium), Adding to the Aqueous Dispersion in Immediate Succession, a Diluted, Non-Oxidizing Acid until a pH-Value of 4-6.5 Is Attained, and Then a Basic Neutralizing Agent until the pH-Value Rises to 7-8, and Then Washing the Dispersion with Water. F. Jage, assignor to Silesia Verein Chemischer Fabriken, both of Saarau, Kreis Schweidnitz, Germany.

2,257,974. **Compounds** Having the General Formula



Where *AR* Represents an Arylene Group; Where *X* Is an Element of the Group Consisting of Divalent Sulphur, Selenium, and Tellurium. W. E. Messer, Cheshire, Conn., assignor to United States Rubber Co., New York, N. Y.

2,258,188. **Vinylidene Chloride Composition** Stabilized to Light and Heat by an Allyl-Type Disulphide. L. A. Matheson, R. F. Boyer, and S. C. Stowe, assignors to Dow Chemical Co., all of Midland, Mich.

2,258,218. **Electrical Insulation** Comprising a Mass of Glass Fibers Coated and Impregnated with Polymeric Methyl Silicon. E. G. Rochow, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,258,219. **Electrical Insulation** Comprising Polymeric Halogenated Aryl Silicon. E. G. Rochow, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,258,220. **Electrical Insulation** Comprising an Intimate Association of Fibrous Inorganic Material and a Composition Comprising a Product of Dehydration of Different Ethyl Silicols. E. G. Rochow, West Albany, N. Y., assignor to General Electric Co.

2,258,221. **Electrical Insulation** Comprising an Intimate Association of Fibrous Inorganic Material and a Composition Comprising a Polymeric Aroxyaryl Silicon. E. G. Rochow, West Albany, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,258,222. **Electrical Insulation** Comprising Glass Fibers Associated with a Composition Comprising a Polymeric Methyl Phenyl Silicon. E. G. Rochow, West Albany, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,258,243. **Composition for Coating Metal Surfaces** Containing a Copolymer of a Vinyl Halide and a Vinyl Ester of an Aliphatic Acid (with Stabilizer). A. K. Doolittle, South Charleston, W. Va., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,258,255. **Electrical Insulation Compound** Consisting of Plasticized Rubber, Polyisobutylene, Zinc Oxide, Polymerized Trimethyl Dihydroquinoline, Carbon Black, Stearic Acid, Tetramethylthiuram Monosulphide, and Sulphur. W. B. MacKenzie, assignor to Phelps Dodge Copper Products Corp., both of New York, N. Y.

2,258,256. **Electrical Insulating Material** Consisting of Isobutylene Polymer, Rubber Plasticized by Oxidation, Said Oxidization Being Catalyzed by Mercaptobenzothiazole, Zinc Oxide, Whiting, Stearic Acid, and Sulphur. W. B. MacKenzie, assignor to Phelps Dodge Copper Products Corp., both of New York, N. Y.

Dominion of Canada

399,496. **A Polymerized Vinyl Aromatic Compound or Copolymer Thereof** and, as a Plasticizing Agent Therefor at least One Cyclohexylated Diphenyl Ether. Dow Chemical Co., assignee of T. A. Kauppi, K. D. Bacon, and F. B. Smith, co-inventors, all of Midland, Mich., U. S. A.

399,660. **Process Which Comprises Vulcanizing Rubber** in the Presence of a Member of the Class Consisting of Diaryl Dithiocarbamic Acids, Their Salts and Esters, and a Member of the Class Consisting of Mercaptothiazoles and Dithiazyl Sulphides in Proportions from 1:3 to 3:1. B. F. Goodrich Co., New York, N. Y., assignee of P. C. Jones, Akron, O., both in the U. S. A.

399,863. **Olefin Polymer Production.** Standard Oil Development Co., Linden, assignee of R. P. Russell, Short Hills, both in N. J., U. S. A.

United Kingdom

538,639. **Synthetic Rubber-Like Materials.** I. G. Farbenindustrie A.G.

539,063. **Preparation of Artificial Mass.** G. Ganz.

539,080. **Diolefins.** I. G. Farbenindustrie A.G.

UNCLASSIFIED

United States

2,256,469. **Dual Tire Inflator.** C. W. Parker, Dobbs Ferry, N. Y.

2,256,553. **Tire Cords** Comprising Cellulosic Yarns Having a Hygroscopic Liquid Incorporated Therein. C. Dreyfus, New York, N. Y.

2,256,688. **Tire Inflation Signal.** L. F. Pierce, Santa Cruz, Calif.

2,256,814. **Recap Tire Balance Wheel.** C. L. Peterson, Cheyenne, Wyo.

2,256,949. **Scraper** for Carbon Black Drum. C. E. McKinney, Borger, Tex., assignor to Continental Carbon Co., a corporation of Del.

2,257,498. **Tire Inflation Apparatus.** C. K. Hansen, Racine, Wis.

2,257,644. **Wire Drawing Mechanism.** R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,257,648. **Reenforcing Element** for Rubber Articles Comprising an Elongated Core of Non-Metallic Yielding Material, and a Tubular Braid of Metal Wires around the Core. R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,257,649. **Reenforcing Element** for Rubber Articles Comprising a Flat Tape Formed of a Plurality of Thin Strands of Non-Metallic Material and Metal Wires; the Non-Metallic Material Carrying Bonding Material to Bond the Reenforcing Element to Rubber. R. C. Pierce, assignor to National Standard Co., both of Niles, Mich.

2,257,787. **Safety Pin Attaching Device.** H. Cohen, assignor to I. G. Kleinert Rubber Co., both of New York, N. Y.

2,257,961. **Tire Deflation and Inflation Indicator.** E. C. Jones, and T. B. Seay, both of San Antonio, Tex.

2,258,179. **Tire Cord** from High-Tenacity Staple Rayon. A. W. Hansen, West Springfield, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,258,334. **Tire Deflation Indicator.** F. A. Miller, Oregon City, Oreg.

2,258,384. **Tire Deflation Indicator.** W. P. Harrington, Hattiesburg, Miss.

Dominion of Canada

399,460. **Can Sealing Machine** with Devices for Cutting a Plug from a Rubber String. American Can Co., New York, assignee of J. M. Hothersall, Brooklyn, both in N. Y., U. S. A.

399,542. **Dual Tire Equalizer.** Kingman Brewster, Washington, D. C., assignee of C. W. Parker, Dobbs Ferry, N. Y., both in the U. S. A.

399,861. **Fuel Wafer** for Vulcanizer Pan. Shaler Co., assignee of H. H. Hanson, both of Waupun, Wis., U. S. A.

United Kingdom

538,786. **Switching Means** in Presses for Vulcanizing Rubber Footwear, Etc. Bata Akciova Spolecnost.

539,044. **Forming Air-Tight Packages.** Wingfoot Corp.

539,065. **Overall Chains or Girdles** for Pneumatic Tires. D. S. Kennedy.

539,087. **Devices to Hold and Fix Adhesive Tape.** G. Drexler.

539,150. **Petrol and Like Tanks.** Hubron Rubber Chemicals, Ltd., and H. Curran.

539,304. **Tire Inspection Apparatus.** Firestone Tire & Rubber Co., Ltd.

539,312. **Deicers** for Aircraft Propeller Blades. B. F. Goodrich Co.

539,384. **Devices to Indicate and/or Control the Specific Gravity of Liquids.** Aktiebolaget Latex.

TRADE MARKS

United States

390,033. **Grey-Rock Flex-Hoz.** Hose. Raybestos-Manhattan, Inc., Passaic, N. J.

390,043. **"Stic-Up"-Dive Bomber.** Rubber-tipped darts in the shape of airplanes. Spotswood Specialty Co., Lexington, Ky.

390,049. **Wearite.** Hose. W. T. Grant Co., New York, N. Y.

390,051. **Quaker.** Tires and inner tubes. Pharis Tire & Rubber Co., Newark, O.

390,101. Representation of a map of the United States above an oval containing the words: **"N.A.P.A. National Automotive Parts Association Assurance of Quality."** Brake lining, packing, hose, fan belts. National Automotive Parts Ass'n, Detroit, Mich.

390,205. **Rome Synthinol.** Electrical conductors, wires, cables, and sleeving. Rome Cable Corp., Rome, N. Y.

390,210. **Autostamp.** Rubber stamps. Kent Hardware Mfg. Corp., New York, N. Y.

390,231. **Electrotite.** Adhesive tape. A. A. Daniels, doing business as Electrotite Co., Chicago, Ill.

390,236. **Gumbits.** Chewing gum. Peerless Chewing Gum Co., Inc., Buffalo, N. Y.

390,252. **India.** Tires and inner tubes. General Tire & Rubber Co., Akron, O.

390,277. Representation of an Eskimo and the word: **"Zeero."** Defrosting and ventilating fans for motor vehicles. Firestone Tire & Rubber Co., Akron, O.

390,358. **"Silk-Tex."** Baby pants. J. B. Kleinert Rubber Co., New York, N. Y.

390,366. **Sun-brette.** Hats. I. B. Kleinert Rubber Co., New York, N. Y.

390,382. **Kabo.** Foundation garments. Kabo Corset Co., Chicago, Ill.

390,395. **Royal London.** Garters, suspenders, etc. Globe Novelty House, New York, N. Y.

390,406. **Wearmaster.** Footwear. Sears, Roebuck & Co., Chicago, Ill.

(*Continued on page* 320)

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Sept. 27	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22
Dec.	22.45	22.50	22.50	22.50	22.50	22.50
Jan.	22.25	22.35	22.35	22.35	22.35	22.35
Mar.	22.10	22.35	22.35	22.35	22.35	22.35
Volume per week (tons)	.550	80	..	20	..	80

THE rubber futures market continued quiet throughout November with some transactions reported in December deliveries. The closing price of January futures on October 31 of 22.35¢ per pound remained unchanged to November 29. There were 62 open contracts on November 27 as compared with 77 on October 31.

The most significant feature in the statistical position reported last month was the decrease in stocks during October. Stocks on October 31 were reported by RMA at 454,711 long tons, or 18,973 tons below September month-end stocks. During October imports were 11,804 tons above consumption. In consideration of these figures there appears to be slightly more than 30,000 tons of rubber unaccounted for. The Firestone fire in October would account for part of this discrepancy; while the balance was presumably due to a readjustment in the basic figures on which the reports are founded.

Another important development in October statistics was the sharp increase in domestic consumption to 60,418 tons. It will be recalled that consumption during September was 53,655 tons, and according to the curtailment plan, October consumption should have dropped to about 50,000 tons. Additional allocations by the OPM were probably the cause of the increase, and this might indicate that the rubber requirements for defense are mounting rapidly.

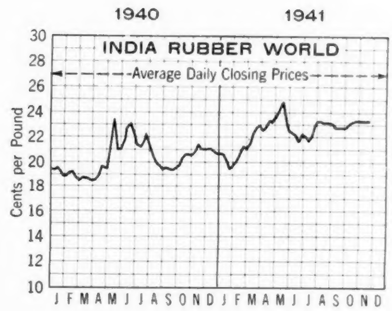
In view of the heavy increase in rubber afloat at the end of October larger imports might be expected for the month of November.

The International Rubber Regulation Committee reported crude rubber exports in September from countries participating in the restriction plan as 144,886 tons against 128,443 tons in August. Net world exports for September totaled 148,307 tons as compared with 131,731 tons in August. Permissible exports for September were 130,362 tons (excluding Thailand). World absorption of crude rubber during September amounted to 98,155 tons, against 95,865 tons for August. World exports for the first nine months of 1941 totaled 1,159,365 tons. Estimated absorption outside the United States rose from 34,000 tons (July) to 41,000 tons (August).

World stocks, as reported by the Commodity Exchange, Inc., set a record high in August. The estimated figure of 859,329 tons compares with 799,934 tons for July and 570,070 tons for August, 1940.

According to the United States Department of Commerce, of the 238,649,154 pounds of rubber, including latex, concentrates, and guayule, imported by the United States in August, 78,083,566 pounds, or 32.7% entered through the customs districts of Los Angeles and San Francisco, against 16.3% in July and 16.6% in June. This large gain in West Coast imports reflects the success of the plan to speed delivery and conserve ship space through transshipment by rail across the continent.

The I. R. R. C., it is reported, will meet in London on December 2. It is believed the Committee will extend the present production quotas of 120% to March 31, 1942.



New York Outside Market—Spot No. 1-X Ribbed Smoked Sheets

Fixed Government Prices*

Plantation Grades	Price Per Lb. Oct. 27-Nov. 29
No. 1-X R.S.S. in cases†	$0.22½
No. 1 Thin Latex Crepe	.23 6/16
No. 2 Thick Latex Crepe	.23 6/16
No. 1 Brown Crepe	.21⅜
No. 2 Brown Crepe	.21 1/16
No. 2 Amber	.21⅜
No. 3 Amber	.21 1/16
Rolled Brown	.17 15/16

* For a complete list of government prices see our October 1, 1941, issue, p. 58.

† Free rubber on New York Outside Market: Oct. 27-Nov. 8, 23⅜¢; Nov. 10-Nov. 29, 23¼¢.

New York Outside Market Rubber Quotations

Latex	Nov. 27, 1940	Oct. 28, 1941	Nov. 28, 1941
	(Dollars and Cents)		
Normal and concentrated (solid content) .... *lb.*	.25/.253	.2825/.295	.2825/.295
Paras			
Upriver fine.... *lb.*	.17	.29	.28½
Upriver fine.... *lb*	*.20¼	*.32¼	*.32½
Upriver coarse. *lb.*	.11½	.16	.16
Upriver coarse. *lb.*	*.17¼	*.22	*.23
Islands fine.... *lb.*	.16¾	.29	.28½
Islands fine.... *lb.*	*.19¾	*.32	*.32
Acre, Bolivian fine .... *lb.*	.17¼	.29¼	.29
Acre, Bolivian fine .... *lb.*	*.20½	*.33	*.33
Beni, Bolivian fine .... *lb.*	.18½	.30	.30
Madeira fine... *lb.*	.17	.30	.28½
Caucho			
Upper ball..... *lb*	.11½	.16	.16
Upper ball..... *lb.*	*.17¼	*.22	*.23
Lower ball..... *lb.*	.11	.15½	.15
Pontianak			
Pressed block.. *lb.*	12/.22	.22/.30	.22/.30
Guayule			
Ampar .... *lb.*	.15½	....	....
Africans			
Rio Nuñez .. *lb.*	.18½	.18	.18
Black Kassai... *lb.*	.19	.18	.18
Prime Niger flake .... *lb.*	.22½	.28	.28
Gutta Percha			
Gutta Siak .... *lb.*	.18	.24	.24
Gutta Soh ..... *lb.*	.25	.30	.30
Red Macassar.. *lb.*	1.20	1.35	....
Balata			
Block Ciudad Bolivar ..... *lb.*	.42	.48	.44
Manaos block.. *lb.*	.45	.47	.45
Surinam sheets. *lb.*	.54	.48	.45
Amber ..... *lb.*	.56	.50	.47

* Washed and dried crepe. Shipments from Brazil.

New York Outside Market

During November the Rubber Reserve Co. continued to sell No. 1-X ribbed smoked sheets in cases at 22½¢ per pound. The free rubber market experienced little activity throughout the month, and it was slightly weakened in the first week by the arrival of a shipment of trade rubber. No. 1-X ribbed smoked sheets closed at a price of 23⅜¢ per pound on October 28 and remained at that figure until November 7 when it dropped to 23¼¢ per pound. This price was maintained through November 29.

RECLAIMED RUBBER

THE R. M. A. has estimated reclaimed rubber consumption for October at 25,009 long tons, an increase of 4% over September; production 26,560 long tons; and stocks on hand October 31, 38,604 long tons. Requirements of reclaim rubber are increasing steadily as crude consumption is being curtailed. The demand is indicated in the greatly increased ratio of reclaim to crude rubber consumption during the late summer and autumn as compared with 1940. In August the percentage of reclaim to crude consumed was 37.7; in September 44.8; in October 41.4; in October, 1940, 28.2%.

Activity during November was reportedly somewhat quieter than October. The demand holds heavy with large amounts going to the tire, insulated wire, and sponge rubber branches of the industry. The market is generally steady.

New York Quotations

November 24, 1941

Auto Tire	Sp. Grav.	¢ per lb.
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼

Tubes	Sp. Grav.	¢ per Lb.
Black	1.14-1.26	11¼/11½
Gray	1.15-1.26	12½/13¼
Red	1.15-1.30	12 /12½
Miscellaneous		
Mechanical blends	1.25-1.50	4½/ 5½
White	1.35-1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

Tire Production Statistics

	Pneumatic Casings		
	Inventory	Production	Shipments
1939	8,664,505	57,612,731	57,508,775
1940	9,126,528	59,186,423	58,774,437
1941			
Jan.	9,797,253	5,486,296	4,849,748
Feb.	10,028,803	5,161,267	4,896,340
Mar.	10,148,861	5,685,559	5,517,255
Apr.	9,957,849	5,839,332	5,999,262
May	8,373,324	6,091,395	7,675,828
June	7,087,737	6,378,844	7,601,993
July	6,234,749	5,577,805	6,449,606
Aug.	5,834,109	4,983,424	5,394,340
Sept.	5,154,081	4,562,972	5,259,225
Oct.	4,122,836	4,834,308	5,867,175

	Pneumatic Casings		
	Original Equipment	Replacement Sales	Export Sales
1939	18,207,556	38,022,034	1,279,185
1940	22,252,869	35,345,656	1,175,912
1941			
Jan.	2,291,209	2,424,730	133,809
Feb.	2,546,120	2,203,297	146,923
Mar.	2,638,066	2,728,557	150,632
Apr.	2,332,427	3,534,323	132,512
May	2,698,799	4,830,449	146,580
June	2,595,259	4,861,281	145,453
July	1,998,436	4,313,042	138,128
Aug.	1,122,227	4,142,407	129,706
Sept.	1,469,223	3,664,310	125,692
Oct.	1,994,383	3,756,963	115,829

	Inner Tubes		
	Inventory	Production	Shipments
1939	7,035,671	50,648,556	51,190,314
1940	7,016,948	52,237,003	52,214,079
1941			
Jan.	7,632,655	5,112,824	4,473,942
Feb.	7,924,383	4,887,190	4,610,313
Mar.	8,068,646	5,349,202	5,181,198
Apr.	8,142,692	5,480,933	5,358,351
May	7,686,194	5,839,405	6,310,202
June	7,010,100	6,263,876	6,908,434
July	6,356,726	5,278,207	5,916,587
Aug.	6,071,075	4,435,690	4,779,735
Sept.	5,430,556	4,143,303	4,792,126
Oct.	4,447,558	4,137,200	5,143,304

	Inner Tubes		
	Original Equipment	Replacement Sales	Export Sales
1939	18,190,630	31,997,906	1,001,778
1940	22,172,452	29,069,547	972,080
1941			
Jan.	2,281,274	2,082,311	110,357
Feb.	2,545,877	1,932,703	131,733
Mar.	2,647,533	2,405,927	127,738
Apr.	2,334,612	2,908,490	115,249
May	2,686,450	3,496,860	126,892
June	2,590,029	4,205,944	112,461
July	2,004,778	3,804,770	107,039
Aug.	1,114,325	3,552,979	112,431
Sept.	1,459,060	3,235,382	97,684
Oct.	1,982,061	3,072,028	89,215

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

ACCORDING TO THE AMERICAN PETROLEUM Institute, the Army is experimenting in refueling tanks by air—dropping by parachute, gasoline in sausage-like rubber bags.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption % of Crude	U.S. Stocks*	Exports
1939	186,000	170,000	28.7	25,250	12,611
1940	208,971	190,244	29.3	32,636	11,347
1941					
Jan.	20,413	19,086	28.9	33,380	557
Feb.	19,507	18,222	29.1	33,654	1,009
Mar.	22,006	19,611	28.4	35,028	1,002
Apr.	21,574	20,247	28.6	35,336	1,151
May	22,775	21,405	30.0	35,871	1,102
June	23,790	22,550	26.5	36,265	878
July	23,111	21,725	31.8	36,751	989
Aug.	24,111	20,864	37.7	39,099	....
Sept.	24,678	24,032	44.8	38,055	....
Oct.	26,560	25,009	41.4	38,604	....

*Stocks on hand the last of the month or year. *Compiled by The Rubber Manufacturers Association, Inc.*

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Net Exports‡	World Absorption‡c	World Stocks†‡§
1939	499,616	592,000	125,800	91,095	44,917a	15,299	988,600	1,112,383	447,666a
1940	818,624	648,500	288,864	145,950	......	26,753	1,391,476	1,100,644	....
1941									
Jan.	86.833	65,989	309,411b	153,169b	......	37,145	151,005	101,832	....
Feb.	73,973	62,692	320,372b	136,955b	......	46,888	97,548	91,019	....
Mar.	87,123	69,024	338,147b	140,228b	......	41,005	130,523	104,293	....
Apr.	63,305	71,374	329,767b	153,484b	......	42,065	120,527	103,222	....
May	101,404	71,365	359,234b	147,454b	......	44,593	123,441	99,514	....
June	64,577	84,912	339,108b	175,499b	......	43,263	125,121	115,183	....
July	97,081	68,653	395,216b	132,304b	......	41,534	131,162	106,353	....
Aug.	106,539	55,365	446,008b	90,591b	......	44,920	131,731	97,065	....
Sept.	83,151	53,655	473,684b	141,756b	......	32,997	148,307	99,355	....
Oct.	72,222	60,418	454,711b	172,633b	......	......	......	......	....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a*Stocks as of Aug. 31, 1939. *b*Includes government emergency rubber. *c*Including producing countries.

OCTOBER crude rubber consumption by domestic manufacturers was 60,418 long tons, 12.6% above September and 1.3% above October, 1940, according to statistics compiled last month by The Rubber Manufacturers Association, Inc.

Gross imports for October, according to the Department of Commerce, totaled *72,222* long tons, 13.1% under September and 3.3% under October, 1940, and included 3,105 tons of latex, compared with 3,252 tons in September. Analysis of data on rubber shipped and afloat, however, indicates November arrivals will be high enough to result in an average of 85,000 long tons for the two months combined. This compares with a monthly average of 88,000 tons during the June-September four-month period.

The average declared import value of the rubber was 19.5¢ a pound, against 18.75¢ in September.

Domestic stocks, on October 31, including government reserves, totaled 454,711 long tons, 4% under September 30 stocks, but 93.20% over stocks on October 31, 1940.

Stocks in the hands of the United States Government, October 31, were 265,738 long tons, 22,487 tons over September 30 stocks, leaving 49,735 tons arrivals or local purchases by the domestic trade during the month.

Stocks afloat for U. S. ports October 31 were 172,633 long tons.

New Incorporations

Lincoln Tire & Rubber Co. of New Jersey, Inc., 380 Union Ave., Irvington, N. J. Capital $10,000. M. Gordon, 380 Union Ave., Irvington; R. R. Silverman and R. Fields, both of 302 Broadway, New York, N. Y. Manufacture tires, tubes, and other rubber products. The company also has an office at 4312 Hudson Blvd., Union City, N. J.

Paraplastics, Inc., New York. Capital 200 shares, no par value. S. G. Buchalter, 270 Fifth Ave., New York, N. Y. Plastics and rubber specialties.

Robinson Rubber Co., 60 Park Pl., Newark, N. J. Capital 1,000 shares, no par value. M. H. Cohn, 60 Park Pl., Newark; G. W. Robinson, 110 Mt. Pleasant Ave., West Orange, N. J.; C. Weinberg, 71 Milford Ave., Newark; and J. A. McKenna, 61 Groove St., Verona, N. J. Manufacture and deal in all kinds of rubber products.

The Wilo Co., 3208 Bergenline Ave., Union City, N. J. Capital 150 shares, no par value. N. J. Marocco, 150—37th Ave., and L. MacLeod, 426—13th Ave., both of Union City, and E. Malloy, 287 Lawton Ave., Grantwood, all in N. J. Manufacture all kinds of rubber and fabrics.

COMPOUNDING INGREDIENTS

THE compounding ingredients market continued active in November, with the demand by the rubber industry reported to be increasing toward the latter part of the month. The supply of certain types of materials continues tight with sales being allocated. Prices in general are steady and unchanged.

CARBON BLACK. The domestic demand for carbon black during November was reported to be heavier than in the preceding month. It is believed that domestic demand will be increasingly augmented by the following factors: increasing shipments under the lend-lease program; larger percentages of black in compounding in the interest of rubber conservation; relatively larger requirements of black for defense products; and increasing use of carbon black for inks and protective coatings as a result of growing shortages of certain colors. Total industry shipments for October were reported at 33,500,000 pounds, or 6,200,000 pounds below September. Producers' stocks were 131,000,000 pounds on October 31, with production at about 40,000,000 pounds for the month. It is believed that consumption will hold closely to production levels during the next few months. Prices are unchanged.

CLAY. Shipments have not increased, indicating no noticeable change in the level of mechanical goods production. Prices are firm.

FACTICE. The demand continues heavy, and prices are firm.

LITHARGE. The movement into consumption continued heavy with some tightness in supplies noted toward the latter part of the month. Prices are firm, but unchanged.

LITHOPONE. The tightness in the market continued with stocks reported at low levels, prices are steady and continue unchanged.

PARAFFIN WAX. The Office of Price Administration has announced, effective December 1, Price Schedule No. 42 which places ceiling prices on crude scale, semi-refined and refined paraffin wax. Crude scale wax, white and yellow, is pegged at 4.25¢ to 5.25¢ per pound, depending on melting point. Prices on semi-refined are fixed in the same range. Fully refined waxes vary from 5¢ for those of low melting point to 10.5¢ for those with a high melting point.

RUBBER CHEMICALS. The demand for accelerators and antioxidants continues to increase. It is believed that the tightness in raw material supply will continue as munitions production is intensified. Prices in general hold at last month's levels.

RUBBER SOLVENTS. After a slackening demand early in November more activity was noted toward the end of the month. Prices remain steady.

TITANIUM PIGMENTS. Prices continue firm as requirements increase. The ability to produce is exceeded by the heavy demand. General Preference Order M-44, which directs the distribution of titanium dioxide for use as a pigment, through a monthly allocations system, was announced November 22. Effective January 1, the order sets up a defense pool which calling for a fixed percentage of each producer's daily production. In addition to taking care of mandatory orders, the pool will be used for supplying potential users who do not have a previous customer rating with the producers. American production of titanium pigments has more than doubled since 1937.

ZINC OXIDES. The demand continues heavy with sales allocated. A zinc oxide committee reportedly had been formed in Canada to assure the diversion of stocks to the most essential industries. Prices are unchanged.

Current Quotations*

Abrasives

Pumicestone, powdered	*lb.*	$0.04 /$0.045
Rottenstone, domestic	*lb.*	.025 / .03

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	*ton*	25.00
Litharge (commercial)	*lb.*	.0825/ .09
Magnesia, calcined, heavy	*lb.*	
technical	*lb.*	

Accelerators, Organic

A-1	*lb.*	.26 / .35
A-10	*lb.*	.34 / .40
A-19	*lb.*	.52 / .65
A-32	*lb.*	.70 / .80
A-77	*lb.*	.42 / .55
A-100	*lb.*	.42 / .55
Accelerator 49	*lb.*	.41 / .42
531	*lb.*	.48 / .50
737	*lb.*	.42 / .43
737-50	*lb.*	.25 / .26
808	*lb.*	.70 / .72
833	*lb.*	1.15
Acrin	*lb.*	.60
Aldehyde ammonia	*lb.*	.65 / .70
Altax	*lb.*	.55 / .60
B-J-F	*lb.*	.50 / .55
Beutene	*lb.*	.70 / .75
Butyl Eight	*lb.*	.98 / 1.00
C-P-B	*lb.*	2.00
Captax	*lb.*	.50
Crylene	*lb.*	
Paste	*lb.*	
D-B-A	*lb.*	2.00
Delac A	*lb.*	.40 / .50
O	*lb.*	.40 / .50
P	*lb.*	.40 / .50
Di-Esterex-N	*lb.*	.60 / .70
DOTG (Di-ortho-tolyguanidine)	*lb.*	.44 / .46
DPG (Diphenylguanidine)	*lb.*	.35 / .36
El-Sixty	*lb.*	.50 / .65
Ethylideneaniline	*lb.*	.42 / .43
Formaldehyde P.A.C	*lb.*	.06 / .0625
Formaldehyde-para-toluidine	*lb.*	.57 / .59
Formaniline	*lb.*	.36 / .37
Guantal	*lb.*	.40 / .50
Hepteen	*lb.*	.35 / .40
Base	*lb.*	1.35 / 1.50
Hexamethylenetetramine U.S.P.	*lb.*	.39
Technical	*lb.*	.33
Lead oleate, No. 999	*lb.*	.145
Witco	*lb.*	.15
Ledate	*lb.*	1.50
Monex	*lb.*	1.55
Novex	*lb.*	
O-X-A-F	*lb.*	.50 / .55
Oxynone	*lb.*	.77 / .90
Para-nitroso-dimethylaniline	*lb.*	.85
Pentex	*lb.*	.75 / .85
Flour	*lb.*	.125 / .135
O	*lb.*	
Flour	*lb.*	
Phenex	*lb.*	.50 / .55
Pip-Pip	*lb.*	1.90
R & H 50-D	*lb.*	.42 / .43
Rotax	*lb.*	.60 / .65
Safex	*lb.*	1.20 / 1.30
Santocure	*lb.*	.80 / 1.00
Selenac	*lb.*	2.00
SPDX	*lb.*	.70 / .75
A	*lb.*	.70 / .75
Super sulphur No. 2	*lb.*	.14 / .16
Tetrone A	*lb.*	2.20
Thiocarbanilide	*lb.*	.26 / .35
Thionex	*lb.*	1.55
Thiurad	*lb.*	$1.55
Trimene	*lb.*	.55 /$0.65
Base	*lb.*	1.05 / 1.20
Triphenylguanidine (TPG)	*lb.*	.45
Tuads, Methyl	*lb.*	1.55
2-MT	*lb.*	.75
Ulto	*lb.*	1.00 / 1.05
Ureka	*lb.*	.60 / .75
Blend B	*lb.*	.60 / .75
C	*lb.*	.56 / .65
Vulcanex	*lb*	.42 / .43
Vulcanol	*lb.*	.85
Z-B-X	*lb.*	2.50
Zenite	*lb.*	.46 / 48
A	*lb.*	.53 / .55
B	*lb.*	.46 / .48
Zimate, Butyl	*lb.*	1.15
Ethyl	*lb.*	1.15
Methyl	*lb.*	1.25
Zipacel	*lb.*	1.90

Activators

Aero Ac 50	*lb.*	.46 / .52
Barak	*lb.*	.50
MODX	*lb.*	.30 / .35
SL No. 20	*lb.*	.085 / .10

Age Resisters

AgeRite Alba	*lb.*	2.00
Gel	*lb.*	.57 / .59
Hipar	*lb*	.65 / .67
Powder	*lb.*	.52 / .54
Resin	*lb.*	.52 / .54
D	*lb.*	.52 / .54
White	*lb.*	1.25 / 1.40
Akroflex C	*lb.*	.56 / .58
Albasan	*lb.*	.70 / .75
Aminox	*lb.*	.52 / .61
Antox	*lb.*	.56
Betanox	*lb.*	.52 / .61
Special	*lb.*	.65 / .74
B-L-E	*lb.*	.52 / .61
Powder	*lb.*	.65 / .74
B-X-A	*lb.*	.52 / .61
Copper Inhibitor X-872-A	*lb.*	1.15
Flectol B	*lb.*	.52 / .65
H	*lb.*	.52 / .65
White	*lb.*	.90 / 1.15
M-U-F	*lb.*	1.50
Neozone (standard)	*lb.*	.63
A	*lb.*	.52 / .54
B	*lb.*	.63
C	*lb.*	.52 / .54
D	*lb.*	.52 / .54
E	*lb.*	.63
Oxynone	*lb.*	.77 / .90
Parazone	*lb.*	.68
Permalux	*lb.*	1.20
Santoflex B	*lb.*	.52 / 65
BX	*lb.*	.58 / .71
Santovar A	*lb.*	1.15 / 1.40
Solux	*lb.*	1.30
Stabilite	*lb.*	.52 / .54
Alba	*lb.*	.70 / .75
Thermoflex	*lb.*	1.20 / 1.15
A	*lb.*	.65 / .67
Tysonite	*lb.*	.16 / .165
V-G-B	*lb.*	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70 / 3.55
liquid, 50%	100 *lbs.*	1.95
solid (700-*lb. drums*)	100 *lbs.*	2.30 / 3.15

Antiscorch Materials

A-F-B	*lb.*	.35 / .40
Antiscorch T	*lb.*	.90
Cumar RH	*lb.*	.105
E-S-E-N	*lb.*	.35 / .40
R-17 Resin (*drums*)	*lb.*	.105
RM	*lb.*	1.25
Retarder W	*lb.*	.36
Retardex	*lb.*	.45 / .48
U-T-B	*lb.*	.35 / .40

Antiseptics

Compound G-4	*lb.*	
G-11	*lb.*	

Antisun Materials

Heliozone	*lb.*	.23 / .24
S.C.R.	*lb.*	.33 / .35
Sunproof	*lb.*	.23 / .28
Jr.	*lb.*	.165 / .215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	*lb.*	
Unicel	*lb.*	.50

Brake Lining Saturant

B.R.T. No. 3	*lb.*	.0175/ .0185

Colors

Black

Du Pont powder	*lb.*	.42 / .44
Lampblack (commercial), *l.c.l.*	*lb.*	.15

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Blue

Du Pont Dispersed	lb.	$0.83 /$3.95
Powders	lb.	2.25 / 3.75
Heliogen BKA	lb.	
Toners	lb.	

Brown

Mapico	lb.	.11

Green

Chrome	lb.	.25
oxide (*freight allowed*)	lb.	.24
Du Pont Dispersed	lb.	.98 / 2.85
Powders	lb.	1.00 / 5.50
Guignet's (*bbls.*)	lb.	.70
Toners	lb.	

Orange

Du Pont Dispersed	lb.	.88 / 2.00
Powders	lb.	.88 / 2.75
Toners	lb.	

Orchid

Toners	lb.	

Pink

Toners	lb.	

Purple

Toners	lb.	

Red

Antimony		
Crimson, 15/17%	lb.	
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	
R.M.P.	lb.	.52
Golden 15/17%	lb.	
7-A	lb.	.37
Z-2	lb.	.25
Cadmium, light (400-*lb. bbls.*)	lb.	.80 / .85
Du Pont Dispersed	lb.	.93 / 2.05
Powders	lb.	.30 / 1.65
Iron Oxide, *l.c.l.*	lb.	
Mapico	lb.	.0975
Rub-Er-Red (*bbls.*)	lb.	.0975
Toners	lb.	

White

Lithopone (*bags*)	lb.	.0385/ .0410
Albalith	lb.	.0385/ .0410
Astrolith (50-*lb. bags*)	lb.	.0385/ .0410
Azolith	lb.	.0385/ .0410
Titanium Pigments		
Ray-bar	lb.	.055 / .065
Ray-cal	lb.	.0525/ .0625
Rayox	lb.	.135 / .165
Titanolith (50-*lb. bags*)	lb.	.0525/ .055
Titanox-A	lb.	.145 / .175
B	lb.	.0575/ .0625
30	lb.	.0575/ .0625
C	lb.	.055 / .06
M	lb.	.0575/ .0625
Ti-Tone	lb.	
Zopaque (50-*lb. bags*)	lb.	.145 / .1525
Zinc Oxide		
Azo ZZZ-11	lb.	.07 / .0725
44	lb.	.07 / .0725
55	lb.	.07 / .0725
66	lb.	.085 / .0875
French Process, Florence		
Green Seal-8	lb.	.0825/ .0850
Red Seal-9	lb.	.0775/ .08
White Seal-7	lb.	.0875/ .09
Kadox, Black Label-15	lb.	.065 / .0675
No. 25	lb.	.0775/ .08
Red Label-17	lb.	.065 / .0675
Horse Head Special 3	lb.	.065 / .0675
XX Red-4	lb.	.065 / .0675
23	lb.	.065 / .0675
72	lb.	.065 / .0675
78	lb.	.065 / .0675
80	lb.	.065 / .0675
103	lb.	.065 / .0675
110	lb	.065 / .0675
St. Joe (lead free)		
Black Label	lb.	.065 / .0675
Green Label	lb.	.065 / .0675
Red Label	lb.	.065 / .0675
U.S.P	lb.	.0975/ .10
Zinc Sulphide Pigments		
Cryptone-BA-19	lb.	.0525/ .055
BT	lb.	.0525/ .055
CB	lb.	.0525/ .055
MS	lb.	.055 / .0575
ZS No. 20	lb.	.0775/ .08
86	lb.	.0775/ .08
230	lb.	.0775/ .08
800	lb.	.0775/ .08
Sunolith	lb.	.0385/ .0410

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	lb.	.55 / .60
Du Pont Dispersed	lb.	1.25 / 1.75
Powders	lb.	.16 / 1.75
Mapico	lb.	.0725
Toners	lb.	

Dispersing Agents

Bardex	lb.	.04 / .0425
Bardol	lb.	.0241/ .0265
B	lb.	.045 / .0475
Darvan No. 1	lb.	.30 / .34
No. 2	lb.	.30 / .34
Nevoll (*drums, c.l.*)	lb.	.0240
Santomerse S	lb.	.11 / .25

Fillers, Inert

Asbestine, *c.l.*	ton	$15.00
Asbestos Fiber	ton	15.00 /$48.00
Barytes	ton	40.00
f.o.b., St. Louis (50-*lb. paper bags*)	ton	25.55
off color, domestic	ton	21.50 /26.50
white, imported	ton	
Blanc fixe, dry, precip.	lb.	.045 / .055
Calcene	ton	37.50 /43.00
Infusorial earth	lb.	.025 / .03
Kalite No. 1	ton	26.00
3	ton	36.00
Kalvan	ton	100.00
Magnesium Carbonate, *l.c.l.*	lb.	.07 / .095
Paradene No. 2 (*drums*)	lb.	.05
Pyrax A	ton	7.00
Whiting		
Columbia Filler	ton	9.00 /14.00
Suprex White	ton	32.50 /48.50
Witco, *c.l.*	ton	8.00

Finishes

Black-Out (surface protective)	gal.	4.00 / 5.00
Mica, *l.c.l.*	ton	
Rubber lacquer, clear	gal.	1.00 / 2.00
colored	gal.	2.00 / 3.50
Shoe Varnish	gal.	1.45
Talc	ton	.025 / .035

Flock

Cotton flock, dark	lb.	.09 / .12
dyed	lb.	.40 / .80
white	lb.	.11 / .20
Rayon flock, colored	lb.	1.00 / 2.00
white	lb.	.75 / 1.00

Latex Compounding Ingredients

A-342	lb.	1.00 / 1.25
Accelerator 85	lb.	.35
89	lb.	1.20
122	lb.	1.30
552	lb.	1.90
Aerosol OT Aqueous 10%	lb.	.125
Antox, dispersed	lb.	.42
Aquarex D	lb.	.75
F	lb.	.85
Areskap No. 50	lb.	.18 / .24
100, dry	lb.	.39 / .51
Aresket No. 240	lb.	.16 / .22
300, dry	lb.	.42 / .50
Aresklene No. 375	lb.	.35 / .50
400, dry	lb.	.51 / .65
Black No. 25, dispersed	lb.	.22 / .40
Casein	lb.	
Collocarb	lb.	.07
Color Pastes, dispersed	lb.	.38 / 1.90
Copper Inhibitor X-872	lb.	2.25
Dispersex No. 15	lb.	.11 / .12
No. 20	lb.	.08 / .10
Factex Dispersion A	lb.	.16
Heliozone, dispersed	lb.	.25
Igepon A	lb.	
Latac	lb.	2.50
MICRONEX, Colloidal	lb.	.06 / 07
Nekal BX (dry)	lb.	
Pipsol X	lb.	3.05 / 3.55
R-2 Crystals	lb.	2.50 / 2.75
RN-2 Crystals	lb.	1.90 / 2.15
S-1 (400-*lb. drums*)	lb.	.65
Santobrite Briquettes	lb.	
Powder	lb.	
Santomerse D	lb.	.41 / .65
S	lb.	.11 / .25
Stablex A	lb.	.90 / 1.10
B	lb.	.65 / .90
C	lb.	.40 / .50
Sulphur, dispersed	lb.	.10 / .15
No. 2	lb.	.08 / .12
T-1 (440-*lb. drums*)	lb.	.40
Tepidone	lb.	.63
Vulcan Colors	lb.	
Zenite Special	lb.	.55
Zinc oxide, dispersed	lb.	.12 / .15

Mineral Rubber

Black Diamond, *l.c.*	ton	25.00 /27.00
B.R.C. No. 20	lb.	.010 / .011
Hydrocarbon, hard	ton	25.00 /27.00
Genasco Hydrocarbon, granulated	ton	
solid	ton	
Gilsonite	ton	
Parmr	ton	25.00 /29.00
Pioneer, *c.l.*	lb.	25.00 /27.00
285°-300°	ton	25.00 /27.00

Mold Lubricants

Aluminum Stearate	lb.	.21 / .24
Aquarex D	lb.	.75
WA Paste	lb.	.25
Colite	gal.	.90 / 1.10
Lubrex	lb.	.25 / .30
Mold Paste	lb.	.12 / .18
Rubber-Glo, conc. regular	gal.	.94 / 1.15
Type W	gal.	.99 / 1.20
Sericite	ton	65.00 /75.00
Soapstone, *l.c.l.*	ton	25.00 /35.00
Zinc Stearate	lb.	.26 / .28

Oil Resistant

A-X-F	lb.	.82 / .85

Reclaiming Oils

B.R.V	lb.	.0325/ .035
No. 1621	lb.	$0.02 /$0.021
S.R.O.	lb.	.019 / .02
X-159	gal.	.20 / .32

Reenforcers

Carbon Black		
Aerfloted Arrow Specification (*bags only*)	lb.	.0335†
Arrow Compact Granulized	lb.	.0335†
Certified Heavy Compressed (*bags only*)	lb.	.0335†
Spheron	lb.	.0335†
Continental, dustless	lb.	.0335†
Compressed (*bags only*)	lb.	.0335†
Disperso	lb.	.0335†
Dixie	lb.	.0335†
Dixiedensed	lb.	.0335†
66	lb.	.0335†
Excello, dustless	lb.	.0335†
Furnex	lb.	.03
Beads	lb.	.03
Gastex	lb.	.03 / .07
HX	lb.	.0335†
Kosmobile	lb.	.0335†
66	lb.	.0335†
Kosmos	lb.	.0335†
MICRONEX Beads	lb.	.0335†
Mark II	lb.	.0335
Standard	lb.	.0335
W-5	lb.	.0335
W-6	lb.	.0335
P-33	lb.	.0475
Pelletex	lb.	.03 / .07
Supreme, dustless	lb.	.0335†
Thermax	lb.	.0225
TX	lb.	.0335†
Velvetex	lb.	.04 / .06
"WYEX BLACK"	lb.	.0335†
Carbonex Flakes	lb.	.029 / .034
S	lb.	.03 / .0325
Plastic	lb.	.03 / .0325
Clays		
Aerfloted Paragon (50-lb. *bags*)	ton	11.00 /23.50
Suprex (50-*lb. bags*)	ton	11.00 /23.50
Barden	ton	10.00
Catalpo, *c.l.*	ton	30.00
Chicora	ton	10.00
China	ton	22.50 /25.00
Crown	ton	10.00
Dixie	ton	10.00
Hi-White	ton	11.00 /23.50
"L"	ton	
LGB	ton	15.00
Langford	ton	7.50
McNamee	ton	10.00
Par	ton	10.00
Paraforce, *c.l.*	ton	50.00
Witco, *c.l.*	ton	10.00
Cumar EX	lb.	.05
MH	lb.	.065 / .115
V	lb.	.095 / .125
Silene	lb.	.04 / .045

Reodorants

Amora A	lb.	
B	lb.	
C	lb.	
D	lb.	
Curodex 19	lb.	
188	lb.	
198	lb.	
Para-Dors	lb.	
Rodo No. 0	lb.	4.00 / 4.50
10	lb.	5.00 / 5.50

Rubber Substitutes

Black	lb.	.08 / .13
Brown	lb.	.08 / .135
White	lb.	.085 / .145
Factice		
Amberex Type B	lb.	.1875
Brown	lb.	.10 / .13
Fac-Cel B	lb.	.15
C	lb.	.15
Neophax A	lb.	.135
B	lb.	.135
White	lb.	.10 / .15

Softeners and Plasticizers

B.R.T. No. 7	lb.	.0175 /.0185
Bondogen	lb.	.98 / 1.05
Burgundy pitch	lb.	
Copene Resin	lb.	.30
Cycline oil	gal.	.14 / .20
Dipolymer Oil	gal.	.30 / .35
Dispersing Oil No. 10	lb.	.035 / .0375
Nevinol	lb.	.13 / .14
Nuba resinous pitch (*drums*)		
Grades No. 1 and No. 2	lb.	.029
3-X	lb.	.0425
Nypene Resin	lb.	.30
Palm oil (Witco), *c.l.*	lb.	
Palmol	lb.	.15
Para Flux	gal.	.09 / .18
No. 2016	gal.	.125 / .20
Para Lube	lb.	.0425/ .048
Piccolyte Resin	lb.	.14 / .175

(*Continued on page* 320)

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.0315 per pound. All prices are carlot.

COTTON AND FABRICS

New York Cotton Exchange Week-End Closing Prices

Futures	Sept. 27	Oct. 25	Nov. 1	Nov. 8	Nov. 15	Nov. 22
Nov.	16.45	16.13	15.98	16.16	.....	.....
Dec.	16.56	16.23	16.07	16.26	16.13	15.91
Mar.	16.81	16.52	16.29	16.48	16.27	16.17
July	16.94	16.72	16.43	16.59	16.30	16.32
Sept.	.....	16.82	16.49	16.67	16.32	16.30
Oct.	.....	.....	16.52	16.71	16.33	16.30

New York Quotations

November 27, 1941

Drills

38-inch 2.00-yard	yd.	....
40-inch 3.47-yard		....
50-inch 1.52-yard		$0.29
52-inch 1.85-yard		.24⅝
52-inch 1.90-yard		.23⅝/.23¾
52-inch 2.20-yard		.21½
52-inch 2.50-yard		.18⅞
59-inch 1.85-yard		.24

Ducks

38-inch 2.00-yard D. F.	yd.	.22 /.22½
40-inch 1.45-yard S. F.		.30⅜
51½-inch 1.35-yard D. F.		.31⅞
72-inch 1.05-yard D. F.		.43¾/.50
72-inch 17-21 ounce		.55⅜
Mechanicals		
Hose and belting	lb.	.45½
Tennis		
51½-inch 1.35-yard	yd.	.34½
51½-inch 1.60-yard	yd.	.29⅜
51½-inch 1.90-yard	yd.	.24¼

Hollands—White

Blue Seal		
20-inch	yd.	.12
30-inch		.21½
40-inch		.24
Gold Seal		
20-inch No. 72	yd.	.12¾
30-inch No. 72		.22½
40-inch No. 72		.25½
Red Seal		
20-inch	yd.	.11¼
30-inch		.20¼
40-inch		.22½

Osnaburgs

40-inch 2.34-yard	yd.	.18¼
40-inch 2.48-yard		.17¼
40-inch 2.56-yard		.14½
40-inch 3.00-yard		.14⅜
40-inch 7-ounce part waste		.13⅛
40-inch 10-ounce part waste		.18¾
37-inch 2.42-yard clean		.17⅝

Raincoat Fabrics

Cotton		
Bombazine 64 x 60	yd.	.11¾
Plaids 60 x 48		....
Surface prints 64 x 60		....
Print cloth, 38½-inch, 64 x 60		.08037
Sheetings, 40-Inch		
48 x 48, 2.50-yard	yd.	.14200
64 x 68, 3.15-yard		.12380
36 x 60, 3.60-yard		.10555
44 x 40, 4.25-yard		.08588
Sheetings, 36-Inch		
48 x 48, 5.00-yard	yd.	.07600
44 x 40, 6.15-yard		.06178

Tire Fabrics

Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.39
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.38½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.38
Cord Fabrics		
23/5/3 Karded peeler, 1$\frac{1}{16}$" cotton	lb.	.39½
15/3/3 Karded peeler, 1$\frac{1}{16}$" cotton	lb.	.37½
12/4/2 Karded peeler, 1$\frac{1}{16}$" cotton	lb.	.36½
23/5/3 Karded peeler, 1¼" cotton	lb.	.44
23/5/3 Combed Egyptian	lb.	.58½
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.41

DURING November the cotton market strengthened slightly and toward the end of the month was in a stronger condition than in late October despite the depressing effects of selling December futures. The price fluctuations were irregular, but within narrow limits, as indicated in the movement of the $\frac{15}{16}$-inch spot middling price, which after closing at 17.07¢ per pound October 31, reached a low for the month of 16.98¢ on November 1, and climbed to 17.34¢ per pound November 8. The price eased to close at 17.16¢ per pound on November 22, and with the market up, closed at 17.46¢ November 29.

The Crop Reporting Board of the Department of Agriculture estimated as of November 1 a domestic cotton production for the current season of 11,020,000 bales of 500 pounds gross weight, as compared with the estimate of 11,061,000 bales for October 1. It was reported that estimates by the trade were only a few thousand bales lower than the government figure. Thus the cotton market's reaction to the announcement of the federal forecast was hardly perceptable.

In recent weeks, it is reported, uncertainties among the trade regarding the cotton clauses of the pending price-control bill have become intensified. The original bill, as considered by the congressional committee, provided ceilings for agricultural products at 100% of parity, or 18¾¢ per pound for cotton. A revision of the bill now provides a 20½¢ per pound maximum. The fact that Washington has not indicated the procedure of applying the ceilings to the market also has added gravity to the concern of the trade.

Domestic consumption of raw cotton in October, amounting to 953,600 running bales, set a new high record, according to the monthly report of the Bureau of the Census. This total shows a marked increase over 875,682 bales consumed in September and 770,832 bales in October, 1940. Mill stocks on October 31 were placed at 1,993,000 bales, and cotton in public storage and at warehouses was reported to be 13,342,123 bales. Apprehension of a growing scarcity of desirable grades and a threat of transportation difficulties were believed to account for the large supplies held by consuming establishments.

The Bureau of the Census reported that 66,322 running bales of cotton were processed into tire fabrics and cords in September, 1941, 7.6% of the total 875,682 bales consumed that month. The percentages for July and August were 7.2% each.

Fabrics

Scattered and generally dull movements in fabrics during November were usually at full ceiling prices. Reasons for the light volume of business were reportedly the narrowing of cotton price fluctuations and the possibility of a power curtailment in the Southeast. It was also believed that mills were waiting for higher cotton prices, and therefore higher ceiling brackets, before offering materials. Efforts to have price ceilings on sheetings and osnaburgs adjusted upward were unsuccessful, it was reported. There was heavy demand for drills and sheetings by the rubber and chemical trades, but few orders were either partially or immediately filled.

Most textile men, it is reported, favor a free cotton market with a sliding-scale ceiling system. Ceilings affecting textiles are not favored by the Army and Navy, it is believed, because in a free market they are able to obtain lower prices than the trade, and it was pointed out that the Navy recently had to pay the full ceiling charged the trade. To judge the effect of present price ceilings and determine whether parallel or dissimilar ceilings should be applied to other fabrics the Office of Price Administration will take periodic inventories of textile holdings of mills, cutters, converters, and possibly distributers, it was reported November 23. The trade believed such information would also improve market operations.

Hollands and sheetings prices remain at last month's levels; while prices on drills have increased 1¢ per yard. Osnaburgs are up from ½¢ to 1¢ per yard, and ducks from 1¢ to 2¢ per yard.

RUBBER SCRAP

RECLAIMERS continued to make heavy demands for rubber scrap on an increasingly active market. Dealers are pressing insistently for scrap materials and making concerted drives in the collection field. The market was somewhat easier than in October, with slightly lowered quotations on mixed black scrap and mixed mechanicals and some classes of tires, inner tubes, and boots and shoes.

Consumers Buying Prices

(Carlot Lots for November 24, 1941)

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01½/$0.01⅝
Colored	lb.	.01¼/ .01⅜
Untrimmed arctics	lb.	.01¼/ .01⅜
Inner Tubes		
No. 1, floating	lb.	.12 / .14
No. 2, compound	lb.	.07⅜/ .07⅝
Red	lb.	.07½/ .07⅝
Mixed tubes	lb.	.06¼/ .06⅜
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	17.00/ 18.00
Beadless	ton	23.50 /24.00
Auto tire carcass	ton	55.00 /57.50
Black auto peelings	ton	54.00 /55.00
Solid		
Clean mixed truck	ton	40.00 /44.00
Light gravity	ton	50.00 /52.00
Mechanicals		
Mixed black scrap	ton	31.00 /32.00
Hose, air brake	ton	29.00 /30.00
Garden, rubber covered	ton	12.00 /14.00
Steam and water, soft	ton	12.00 /14.00
No. 1 red	lb.	.04¾/ .05
No. 2 red	lb.	.03½/ .04
White druggists' sundries	lb.	.04 / .04½
Mixed mechanicals	lb.	.02½/ .02¾
White mechanicals	lb.	.04¼/ .04½
Hard Rubber		
No. 1 hard rubber	lb.	.16 / .17

New Publications

(Continued from page 306)

"Moisture Characteristics of Carbon Black." Stuart V. Stoddard and Chester P. Baker. Bulletin No. 6. Northeastern University Publications, Northeastern University, Boston, Mass. 15 pages. This report describes the technique used and results obtained by the authors in an investigation to determine equilibrium moisture content and rates of sorption and desorption of carbon black at different humidities in a cork insulated cabinet. This subject is said to be of interest because experience indicates that in rubber compounding a black containing from 2 to 4% moisture gives a much better product than a practically bone-dry black.

"Comparative Burning Tests of Common Plastics." Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago, Ill. 13 pages. Thirteen plastics including vinyl polymers were subjected to laboratory tests to determine whether they are combustible or non-combustible, and this booklet presents tabulated data resulting from observations made during the tests. The plastics were classified into three categories: those which burn at about the same rate as cellulose acetate; those which burn with a feeble flame which may or may not propagate away from the source of ignition; and those which burn only during the application of the test flame.

"A Hard Rubber Manual." Joseph Stokes Rubber Co., Trenton, N. J. 32 pages. Offered as a manual for readers not entirely familiar with the properties and the processing of hard rubber, this booklet devotes brief descriptive sections to composition and compounding; molding and types of molds; the fabrication of rods and tubing, sheets, and blown goods; machining; coloring; cost factors; and the future of hard rubber. The booklet publishes a table comparing the physical properties of hard rubber with those of five chemical plastics. Also presented are three graphs which relate cost and time of cure, cost and size of mold for a small piece, and cost and size of mold for a medium-size piece.

"Ti-Pure R" and "Ti-Cal R." Krebs Pigment & Color Corp., Wilmington, Del. 15 pages and 9 pages, respectively. These two booklets describe the qualities of the two rutile titanium dioxide pigments, "Ti-Pure R" and "Ti-Cal R", in relation to their use in paint products. Properties which are discussed include hiding power, color, tinting, light stability, drying, baking discoloration, consistency, abrasiveness, etc. Both booklets contain graphs illustrating the properties of the rutile pigments, comparing them, to some extent, with those of the anatase pigments. Anatase and rutile are described as different crystal forms of titanium dioxide; having the larger index of refraction, rutile possesses greater opacity, the booklets state.

"Shall We Defend or Attack?" No. 41 in a series of booklet-editorials. Farrel-Birmingham Co., Inc., Ansonia, Conn. This booklet, which supports a policy of strategic military offensive in the event of war, warns that the present "defensive minded" attitude of the public constitutes a serious threat to our national unity and security. The public antipathy to an offensive war is held to arise from the historic non-aggressive foreign policy of the nation.

"Automobile Facts and Figures." Twenty-third edition, 1941. Automobile Manufacturers Association, Detroit, Mich. 96 pages. This automotive review for the year 1940 covers production, registration, sales, employment, highways, taxes, and use. A new section, "Defense", has been added to the book, which points to the accomplishments of the automotive industry in connection with the country's defense effort.

"A.S.T.M. Standards on Textile Materials." October, 1941. American Society for Testing Materials, 260 S. Broad St., Philadelphia, Pa. 380 pages. Price $2. This annual compilation covers 68 specifications relating to quality, tolerances, test procedures, and equipment, and definitions developed by the A.S.T.M. through the work of its Committee D-13 on various textile materials. Photomicrographs of textile fibers, tabular data, and a glossary of terms are included.

World Net Imports of Crude Rubber—Long Tons

Year	U.S.A.	U.K.†	Argentine	Australia	Belgium	Canada	France	Greater Germany‡	Italy	Japan	Poland	Sweden	U.S.S.R.	Rest of World	Total
1938...	406,300	168,172	7,700	12,300	11,300	25,700	58,100	107,900	28,200	46,300	7,900	8,300	26,800	49,200	928,000
1939...	486,348	112,249¶	9,600	15,400	9,600	32,500	33,751§	62,344§	12,582§	42,300	5,415§	7,965*a*	14,000*	61,866	603,842¶
1940...	811,564	....	10,019	19,044	1,585*b*	52,567	....	....	....	30,847*c*	....	....	....	....	....
1941															
Jan. ..	86,541	....	706	1,065	....	6,290	....	....	....	....	....	....	....	....	....
Feb. ..	73,646	....	362	1,717	....	3,770	....	....	....	....	....	....	....	....	....
Mar. ..	86,794	....	975	3,486	....	3,879	....	....	....	....	....	....	....	....	....
Apr. ..	64,521	....	328	2,326	....	2,531	....	....	....	....	....	....	....	....	....
May ..	101,034	....	376	1,549	....	5,596	....	....	....	....	....	....	....	....	....
June ..	64,101	....	1,000	1,373	....	2,818	....	....	....	....	....	....	....	....	....
July ..	96,658	....	1,684	2,003	....	4,143	....	....	....	....	....	....	....	....	....
Aug. .	105,556	....	....	1,251	....	10,683	....	....	....	....	....	....	....	....	....
Sept. .	81,500*	....	....	4,392	....	....	....	....	....	....	....	....	....	....	....

*Estimated. †U. K. figures show gross imports, not net imports. ‡Including imports ot Austria and Czechoslovakia. ¶Up to Aug. 31, 1939, only. §Up to July 31, 1939, only. *a*Up to September 30, 1939. *b*Jan.-Feb. *c*Jan.-Aug. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries—Long Tons

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Thailand	French Indo-China	Total	Philippines and Oceania	Liberia	Nigeria (incl. Brit. Cameroons)	Other Africa	South America	Mexican Guayule	Grand Total
1939 ..	376,800	372,000	61,000	9,200	6,600	11,900	24,000	41,800	65,200	968,500	2,100*	5,400	2,800	6,600*	16,100	2,900	1,004,400
1940 ..	540,417	536,740	88,894	11,510	9,668	17,623	35,166	43,940	64,437	1,348,395	2,267*	7,223	2,903	7,200*	17,601	4,106	1,389,695
1941																	
Jan. ..	37,804	58,593	7,859	531	955	2,085	2,445	2,137	9,058	121,467	333	750*	67	600	2,103	288	125,608
Feb. ..	27,115	42,091	4,332	399	1,022	1,686	2,922	4,137	1,995	85,699	96	828	254	600	1,814	414	89,705
Mar. ..	56,651	53,233	6,073	485	1,285	1,154	3,726	5,712	6,286	134,605	117	958	36	600	2,835	355	139,506
Apr. ..	40,590	48,915	6,985	497	1,164	2,175	3,118	4,271	0	107,715	263	750*	264	600	2,009	423	112,024
May ..	53,062	48,099	7,638	812	1,019	1,237	3,849	1,841	6,225	123,782	156	180	200*	600	1,080	334†	126,332
June ..	51,247	48,496	8,925	234	822	986	3,195	2,831	7,318	124,054	200*	919	200*	600	1,510	250*	127,733
July ..	53,373	53,429	7,387	273	666	1,803	3,799	3,614	3,445	127,789	200*	750*	200*	600	1,253	250*	131,042
Aug. ..	46,404	51,890	9,081	575	150	1,812	3,086	4,852	6,496	124,346	200*	750*	200*	600	1,288	250*	127,634
Sept. ..	70,598	65,496	6,706	87	58	1,371	2,495	6,524	8,000*	161,335	200*	750*	200*	600	1,421	250*	164,756

*Estimated. †Guayule rubber imports into U.S.A. provisional until export figures from Mexico are received. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Rims Approved and Branded by The Tire & Rim Association, Inc.

Rim Size	9 Months 1941
Passenger Car Rims	
15" and 16" Drop Center (See Table of Not Branded Rims at End)	
16x3.50D	117,484
16x4.00E	4,833,973
16x4.25E	8,197
15x4.50E	8,738
16x4.50E	2,584,597
15x5.00E	277,907
16x5.00E	678,586
15x5.00F	79,686
16x5.00F	1,067,369
15x5.50F	688,842
16x5.50F	39,514
16x6.00F	27,278
16x4.00E "Hump"	2,245,848
16x4.25E "Hump"	702,485
16x4.50E "Hump"	14,822
15x5.00F "Hump"	41,627
15x5.50F "Hump"	12,411
15x6-L	173,400
16x6-L	99,229
15x6½-L	16,856
16x6½-L	259
17" and Over Drop Center	
All Sizes	91,208
Clincher	
All Sizes	3,297
Truck and Bus Rims	
Flat Base	
15x5	8,402
17x5	42,348
18x5	299
20x5	449,767
17x6	100,770
18x6	2,339
20x6	1,188,444
24x6	15,319
15x7	14,191
17x7	156
18x7	13,585
20x7	1,698,901
24x7	5,082
15x8	7,449
18x8	30,384
20x8	452,269
22x8	44,238
24x8	4,647
15x9/10	31
18x9/10	6,052
20x9/10	103,489
22x9/10	13,639
24x9/10	16,367
19x11	2,910
20x11	7,683
24x11	10,376
24x10.00	855
Semi-Drop Center for Light Trucks	
16x4.50E	62,600
15x5.50F	6,148
16x5.50F	334,050
Agricultural Rims	
Drop Center and Semi-Drop Center	
12x2.50C	14,790
15x2.50C	1,655
18x2.50C	2,393
12x3.00D	29,229
15x3.00D	208,992
16x3.00D	37,554
18x3.00D	4,423
19x3.00D	75,032
21x3.00D	21,971
24x3.00D	631
30x3.00D	700
36x3.00D	3,849
17x3.25E	1,206
18x3.25E	3,777
19x3.25E	3,650
21x3.25E	9,421
28x4.00E	455
18x4.19F	5,518
20x4.50E	8,581
22x4.50E	5,047
24x4.50E	114
36x4.50E	3,354
13x5.50F	7,459
18x5.50F	28,899
20x5.50F	31,972
24x5.50R	11,922
32x5.50R	595
36x5.50R	666
40x5.50R	1,598
24x6.00S	8,091
28x6.00S	789
36x6.00S	9,439
40x6.00S	1,979
20x8.00T	2,177
24x8.00T	47,917
28x8.00T	10,997
32x8.00T	6,313
36x8.00T	7,661
40x8.00T	856
42x8.00T	140
44x8.00T	116
W4-30	106
Drop Center and Semi-Drop Center (*Cont'd*)	
W4.5-40	1,821
W6-32	580
W7-24	19,677
W7-32	29,028
W7-36	14,657
W7-38	1,354
W7-44	5,094
W8-24	73,507
W8-28	5,887
W8-32	12,565
W8-36	12,498
W8-38	20,027
W8-40	5,499
W9-24	4,617
W9-28	782
W9-36	17,750
W9-38	10,855
W9-40	967
W10-24	1,627
W10-28	31,064
W10-36	44,929
W10-38	782
W10-40	10,699
W11-24	5,243
W11-28	1,567
W11-32	382
W11-36	556
DW7-38	1,679
DW8-38	36,407
DW8-40	139
DW9-26	955
DW9-38	77,241
DW10-24	1,079
DW10-26	1,395
DW10-28	1,260
DW10-36	3,278
DW10-38	35,070
DW11-24	5,686
DW11-26	1,500
DW-11-28	13,193
DW11-30	306
DW11-32	7,254
DW11-36	6,873
DW11-38	12,284
DW12-30	7,756
Cast Rims	
10x5.00F	42
10x6.00F	281
20x11.25	12
24x11.25	115
32x11.25	8
24x13.00	496
24x15.00	941
40x15.00	36
32x18.00	81
Airplane Rims	
All Sizes	2,788
Total	19,630,606

"Hump Bead Seat" Rims Inspected but Not Branded (Not Listed Above)
Passenger Car Rims—15" and 16" Drop Center

16x4.00E	523,562
16x4.25E	145,323
16x4.50E	2,550
15x5.00F	10,687
Total	682,122

Trade Marks

(*Continued from page* 310)

390,408. **Curve-flex.** Windshield wiper blades and parts. Anderson Co., Gary, Ind.
390,422. **Permoflex.** Elastic threads and strands. American Mills Co. of New York, West Haven, Conn.
390,425. **Checkmates.** Girdles. William Carter Co., Needham Heights, Mass.
390,453. **"Smarty Pants."** Girdles. Gluvtex Corp., New York, N. Y.
390,460. **Rustiquita.** Clothing, shoes, etc. Best & Co., Inc., New York, N. Y.
390,461. Representation of two women's silhouettes below the words: **"Life Stride."** Shoes. Milius Shoe Co., St. Louis, Mo.
390,484. Representation of toy blocks arranged to spell the word: **"Child"**, above the word: **"Saver."** Children's clothing and accessories. B. Billow, New York, N. Y.
390,505. **Top-flite.** Balls. A. G. Spalding & Bros., Inc., Chicopee, Mass.
390,520. Representation of a circle containing the letter: **"T"**, between the words: **"Safe"** and **"Ring."** Prophylactic articles. Prophylactic Products Corp., Boston, Mass.
390,529. **Super Mileage.** Tread repair material. B. F. Goodrich Co., New York, N. Y.
390,654. **"Sky Lasts."** Shoes. John Wanamaker Philadelphia, Philadelphia, Pa.
390,660. **Treo.** Foundation garments. Treo Co., Inc., New York, N. Y.
390,682. Representation of a shield containing the letters: **"R"** and **"M."** Mechanical rubber goods. Raybestos-Manhattan, Inc., Passaic, N. J.
390,696. **ThoroCrafts.** Footwear. Thayer McNeil Co., Boston, Mass.
390,713. **Eagle.** Golf balls. Spalding Sales Corp., Chicopee, Mass.
390,716. **Tread-Lock.** Tread repair parts. Webster Rubber Co., Warren, O.
390,732. **Airmiser.** Tires and tubes. Pharis Tire & Rubber Co., Newark, O.

Current Quotations

(*Continued from page* 314)

Softeners and Plasticizers (Cont'd)

Pine tar	*gal.*	
Oil	*gal.*	
Plastogen	*lb.*	$0.0775/$0.08
Plastone	*lb.*	.27 / .30
R-19 Resin (*drums*)	*lb.*	.105
21 Resin (*drums*)	*lb.*	.105
Reogen	*lb.*	.12 / .18
RPA No. 1	*lb.*	.65
2	*lb.*	.65
3	*lb.*	.46
4	*lb.*	.80
Tackol	*lb.*	.085 / .18
Tonox	*lb.*	.52 / .61
Tonox D	*lb.*	.75 / .85
Witco No. 20, *l.c.l.*	*gal.*	.20
X-1 resinous oil (*tank car*)	*lb.*	.011

Softeners for Hard Rubber Compounding

Resin C Pitch 45° C. M.P.	*lb.*	.013 / .014
60°C. M.P.	*lb.*	.013 / .014
75°C. M.P.	*lb.*	.013 / .014

Solvents

Beta-Trichlorethane	*lb.*	.20
Carbon Bisulphide	*lb.*	
Tetrachloride	*gal.*	
Cosol No. 1	*gal.*	.25
No. 2	*gal.*	.24
No. 3	*gal.*	.22
Industrial 90% benzol (*tank car*)	*gal.*	.14 / .21
Skellysolve	*gal.*	

Stabilizers for Cure

Barium Stearate	*lb.*	.22 / .46
Calcium Stearate	*lb.*	.23 / .27
Laurex (*bags*)	*lb.*	.15 / .175
Lead Stearate	*lb.*	
Magnesium Stearate	*lb.*	.27 / .30
Stearex B	*lb.*	.1375/ .1475
Beads	*lb.*	.1325/ .1425
Stearic acid, single pressed	*lb.*	.1375/ .1475
Stearite, *c.l.*	*lb.*	.1325
Zinc Laurate	*lb.*	.27 / .30
Stearate	*lb.*	.26 / .31

Synthetic Rubber

Hycar O. R.	*lb.*	.70 / 1.00
Neoprene Type CG	*lb.*	.70
E	*lb.*	.65
FR	*lb.*	.75
G	*lb.*	.70
GN	*lb.*	.65
I	*lb.*	.70
KN	*lb.*	.75
M	*lb.*	.65
Neoprene Latex Type 56	*lb.*	.30
57	*lb.*	.30
Synthetic 100	*lb.*	.41
"Thiokol" Type "A"	*lb.*	.35 / .45
"F"	*lb.*	.45 / .55
"FA"	*lb.*	.50 / .60
"RD"	*lb.*	.70

Tackifier

B.R.H. No. 2	*lb.*	.02 / .021

Vulcanizing Ingredients

Magnesia, light (for neoprene)	*lb.*	.26
Sulphur	100 *lbs.*	2.05
Chloride (*drums*)	*lb.*	.04
Telloy	*lb.*	1.75
Vandex	*lb.*	1.75
(See also Colors—Antimony)		

Waxes

Carnauba, No. 3 chalky	*lb.*	
2 N.C.	*lb.*	
3 N.C.	*lb.*	
1 Yellow	*lb.*	
2	*lb.*	
Carnube	*lb.*	.46 / .56
Monten	*lb.*	.125 / .17
Rubber Wax No. 118, Neutral	*gal.*	.60 / 1.15
Colors	*gal.*	.70 / 1.25

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

FACTORY SUPERINTENDENT OR ASSISTANT, 25 YEARS' EXperience in compounding, development, and production of synthetics and rubber products. Experienced in installation and supervision of equipment. At present engaged in similar position. Location immaterial. Address Box No. 345, care of INDIA RUBBER WORLD.

SUPERINTENDENT, FIFTEEN YEARS' PRACTICAL EXPERIence producing rubber and synthetic molded and extruded goods. Thorough knowledge compounding, processing, cost, production, maintenance, and personnel. Now holding responsible position but desire change. Available short notice. Address Box No. 357, care of INDIA RUBBER WORLD.

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INTERESTED IN PURCHASING OR RENTING A RUBBER FACtory—modern equipment. Also used Grinding Machines in perfect condition. Make detailed offer. Address Box No. 347, care of INDIA RUBBER WORLD.

SMALL MECHANICAL GOODS PLANT, METROPOLITAN NEW York section, with mills, tubers, presses, pumps, accumulators, etc. Attractive proposition to right party. Will sell or rent complete. Can begin operations immediately. Address Box No. 356, care of INDIA RUBBER WORLD.

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ASBESTINE

REG. U. S. PAT. OFF.

Compounding Ingredients for Rubber

by the Editors of

INDIA RUBBER WORLD

$2.50 Postpaid in U. S. A. **$2.75 Elsewhere**

An International Standard of Measurement for

Hardness • Elasticity Plasticity of Rubber, etc.

Is the DUROMETER and ELASTOMETER (23rd year)

These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.

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Agents in all foreign countries.

SITUATIONS OPEN

WANTED: ASSISTANT PRODUCTION SUPERVISOR IN SMALL plant manufacturing general line of rubber-proofed goods. Some plant experience with technical background required. Knowledge of synthetics desirable. State education, experience, and salary expected. Address Box No. 346, care of INDIA RUBBER WORLD.

PLANT SUPERINTENDENT—EXPERIENCED ON MOLDED Goods, Rolls, Compounds and Army and Navy specifications. Must know synthetic rubber of all types. Also Mold Designing. Address Box No. 349, care of INDIA RUBBER WORLD.

CHEMIST—WITH EXPERIENCE IN DEVELOPment, production of industrial and hospital types of adhesive tape. Give full details; experience, salary, etc. Address M.C., Box No. 352, care of INDIA RUBBER WORLD.

WANTED: MAN EXPERIENCED IN TIME STUDY, JOB ANALysis, and method improvement. State details, salary, and when available. Address Box No. 353, care of INDIA RUBBER WORLD.

EXPERIENCED RUBBER FOOTWEAR CHEMIST WANTED FOR Canadian Factory. State experience and salary expected. Address Box No. 354, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST—FOR DEVELOPMENT AND REsearch—leading progressive Eastern company offers good opportunity to man possessing initiative and several years of experience in compounding and testing of rubber and synthetic rubbers. State age, experience, and salary expected. Address Box No. 355, care of INDIA RUBBER WORLD.

CHEMIST WANTED: PROGRESSIVE RUBBER PLANT IN EAST has an opening for an experienced chemist capable of assisting in general management of entire plant. Wonderful opportunity for right man. In replying state in full; background and desired salary. Address Box No. 358, care of INDIA RUBBER WORLD.

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Sponge Rubber: Sheeted—Die Cut—Molded

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SANITARY WEAR	RUBBER SPECIALTIES
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LEVI C. WADE CO.

79 BENNETT ST. **LYNN, MASS.**

(*Advertisements continued on page 323*)

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Wringer Co., Inc.	Com.	$0.30 yr.-end	Dec. 15	Dec. 1
Anaconda Wire & Cable Co.	Com.	$1.00 yr.-end	Dec. 22	Dec. 12
Armstrong Cork Co.	Com.	$0.75-yr.-end	Dec. 23	Dec. 8
Armstrong Rubber Co., Inc.	"A" & "B"	$1.00 yr.-end	Dec. 15	Dec. 1
Belden Mfg. Co.	Com.	$0.50 yr.-end	Dec. 1	Nov. 17
Boston Woven Hose & Rubber Co.	Com.	$3.00 s.	Dec. 15	Dec. 1
Brunswick-Balke-Collender Co.	Com.	$1.00	Dec. 15	Dec. 1
Brunswick-Balke-Collender Co.	Pfd.	$1.25 q.	Jan. 2	Dec. 20
Canada Wire & Cable Co., Ltd.	"B"	$0.50 interim	Dec. 15	Nov. 30
Canada Wire & Cable Co., Ltd.	"A"	$1.00 q.	Dec. 15	Nov. 30
Canada Wire & Cable Co., Ltd.	"A" Pfd.	$1.625 q.	Dec. 15	Nov. 30
Collins & Aikman Corp.	Com.	$0.25	Dec. 1	Nov. 18
Crown Cork & Seal Co., Inc.	Com.	$0.50	Dec. 22	Nov. 28
Crown Cork & Seal Co., Inc.	Pfd.	$0.5625 q.	Dec. 15	Nov. 28
Detroit Gasket & Mfg. Co.	Com.	$0.25	Jan. 20	Jan. 5
Detroit Gasket & Mfg. Co.	Pfd.	$0.30 q.	Dec. 1	Nov. 25
Dewey & Almy Chemical Co.	"A"	$0.50	Dec. 15	Dec. 1
Dewey & Almy Chemical Co.	"B"	$0.55	Dec. 15	Dec. 1
Dewey & Almy Chemical Co.	$5 Cum. Cv. Pfd.	$1.25 q.	Dec. 15	Dec. 1
Dewey & Almy Chemical Co.	Pfd.	$1.00 final	Dec. 15	Dec. 1
Dominion Textile Co., Ltd.	Com.	$1.25 q.	Jan. 2	Dec. 1
Dominion Textile Co., Ltd.	Pfd.	$1.75 q.	Jan. 15	Dec. 15
Dunlop Tire & Rubber Goods Co., Ltd.	Com.	$0.50	Dec. 20	Dec. 15
Dunlop Tire & Rubber Goods Co., Ltd.	Pfd.	$0.625 q.	Dec. 31	Dec. 15
E. I. du Pont de Nemours & Co., Inc.	Com.	$1.75 yr.-end	Dec. 13	Nov. 24
E. I. du Pont de Nemours & Co., Inc.	Pfd.	$1.125 q.	Jan. 24	Jan. 9
Electric Storage Battery Co.	Com.	$1.00 yr.-end	Dec. 23	Dec. 3
Firestone Tire & Rubber Co.	Com.	$0.50 yr.-end	Dec. 15	Dec. 5
Firestone Tire & Rubber Co.	Pfd.	$1.50 q.	Dec. 1	Nov. 17
Flintkote Co.	Com.	$0.25	Dec. 25	Dec. 13
Flintkote Co.	Pfd.	$1.125 q.	Dec. 15	Dec. 10
General Electric Co.	Com.	$0.35 yr.-end	Jan. 24	Dec. 26
B. F. Goodrich Co.	Com.	$1.25 yr.-end	Dec. 20	Dec. 8
B. F. Goodrich Co.	$5 Pfd.	$1.25 q.	Dec. 24	Dec. 12
Hercules Powder Co.	Com.	$1.20 yr.-end	Dec. 19	Dec. 8
Hewitt Rubber Corp	Com.	$0.75 yr.-end	Dec. 15	Nov. 29
Intercontinental Rubber Corp.	Com.	$0.40 yr.-end	Dec. 17	Dec. 3
Midwest Rubber Reclaiming Co.	$4 Pfd.	$1.00 q.	Dec. 1	Nov. 20
Okonite Co.	Com.	$0.50 extra	Nov. 1	Oct. 22
Okonite Co.	Com.	$1.50 q.	Nov. 1	Oct. 22
Okonite Co.	6% Pfd.	$1.50 q.	Dec. 1	Nov. 14
Plymouth Rubber Co., Inc.	"B"	$3.00 resumed	Dec. 3	Dec. 1
Raybestos-Manhattan, Inc.	Com.	$0.875 yr.-end	Dec. 15	Nov. 28
Russell Mfg. Co.	Com.	$0.375	Dec. 15	Nov. 29
Thermoid Co.	Com.	$0.40	Dec. 11	Dec. 1
Thermoid Co.	Cv. Pfd.	$0.75 q.	Dec. 15	Dec. 1
United States Rubber Co.	8% Pfd.	2%	Dec. 19	Dec. 5
Westinghouse Electric & Mfg. Co.	Com.	$1.00	Dec. 15	Nov. 18
Westinghouse Electric & Mfg. Co.	Com.	$1.00 yr.-end	Dec. 23	Dec. 9
Westinghouse Electric & Mfg. Co.	Pfd.	$1.00	Dec. 5	Nov. 18
Westinghouse Electric & Mfg. Co.	Pt. Pfd.	$1.00 yr.-end	Dec. 23	Dec. 9

See page 327

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—Watson-Stillman Hydro-Pneumatic Accumulator; 1—5 ft. dia. Vulcanizer, with quick-opening door; 20-Semi-automatic Hydraulic Presses; 1—Birmingham 16"x36" Rubber Mill, m.d.; 12—30"x40", 1—38"x78" Hydraulic Presses; Hydraulic Pumps, Calenders, Tubers, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

FOR SALE: Mikro Pulverizers; W. & P. Mixers; Brighton 80 gal. Change Can Mixers; Pony Mixers; Driers, etc. Cash Buyers of your surplus equipment—from single items to complete plants. BRILL EQUIPMENT CORPORATION, 183 Varick Street, New York City.

FOR SALE: 2—W. & P. Jack. Mixers, Size 15; 1—Day No. 30 Imperial Mixer; 1—Two-Roll Water-Cooled Rubber Mill, 6" & 8" dia. x 9" face; Rotary Cutters; 75 ft. Link Belt Conveyer, 36" wide; Hydraulic Presses, Pumps and Accumulators, Rubber Mills, Mixers, Grinders, Pulverizers, etc. Send for latest bulletins. We buy your surplus equipment. STEIN EQUIPMENT CORP., 426 Broome St., New York City.

1—CUT FARREL-SYKES D. H. GEAR, 15" FACE, 7.313" BORE; 1—Cut Farrel-Sykes D. H. Pinion, 15" Face, solid on shaft 4' 2$\frac{7}{16}$" long; 1—Meehanite Cut Spur Drive Gear, 70.666", 106 Teeth, 1½ D. P., 7" Face, 8.752" Bore, 72.000" O. D., #C-3296. Address Box No. 351, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES WANTED

WANTED: 1—Banbury Mixer; 2—Mills; 1—Calender; 5—Hydraulic Presses, with pump and accumulator; 2—Tubers. Address Box No. 348, care of INDIA RUBBER WORLD.

WANTED BY MANUFACTURER: THREE HYDRAULIC STEAM-heated platen presses, 24" x 24" to 30" x 30", ram diameter 12" to 18". Give description, location, and price in first letter. Address Box No. 350, care of INDIA RUBBER WORLD.

RUBBER CUTTER, GUILLOTINE TYPE, WITH SELF-CONTAINED hydraulic unit. Black Rock or equivalent. SPEED PRODUCTS CO., 37-18 Northern Blvd., Long Island City, N. Y.

Amendment 3[1] to M-15

On November 12 defense authorities acted to determine if rubber is being equitably distributed among plants throughout the country. Donald M. Nelson, Director of Priorities, ordered rubber processors operating plants in more than one community to file reports within 15 days on distribution of rubber among individual plants. The order, issued as an amendment to General Preference Order M-15, is presented in full below.

By this order OPM will have closer scrutiny of rubber distribution by large processors operating plants in several communities and will be able to determine if there have been instances of distribution on so uneven a scale as to result in severe labor displacement in any one community, or in any unnecessary reduction in the manufacture of rubber products.

At the time that the order was issued it was stated that discussions are in progress on plans for extending the rubber conservation program beyond December.

It is hereby ordered that:

(a) Section 940.1 General Preference Order No. M-15 is hereby amended by inserting immediately after paragraph (m) thereof the following new paragraph:

"(n) Each Company (which term when used in this paragraph shall include any corporation together with all other corporations controlling, and all other corporations controlled by, such corporation) which is a Processor of Rubber and which operates plants in more than one community (all plants operated by the same Company in the same community being herein collectively referred to as a "Unit") shall (i) within fifteen days after the effective date of this order file with the Rubber and Rubber Products Branch of the Division of Civilian Supply, Office of Production Management, a report showing the amount of Rubber processed or consumed by each Unit during the month of July, 1941; and (ii) immediately upon any distribution of Rubber for any calendar month among its Units which is at a ratio which differs materially from the ratio of processing or consumption by such Units during July, 1941, file with the Rubber and Rubber Products Branch of the Division of Civilian Supply, Office of Production Management, a full report thereof showing clearly the reasons for such departure in ratio of distribution. In any case in which it appears that such change in ratio was not justified or proper, the Office of Production Management will take such action as it may deem appropriate."

(b) This order shall take effect upon the date of the issuance thereof.

(P.D. Reg. 1, Aug. 27, 1941, 6 F.R. 4489; O.P.M. Reg. 3, March 8, 1941, 6 F.R. 1596, as amended Sept. 12, 1941, 6 F.R. 4865; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875, Aug. 28, 1941, 6 F.R. 4483; sec. 2(a) Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session; sec. 9, Public No. 783, 76th Congress, Third Session.)

Issued this 12th day of November, 1941.

DONALD M. NELSON,
Director of Priorities.

[1] Title 32—National Defense, Chapter IX—Office of Production Management, Subchapter B—Priorities Division, Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

[2] General Preference Order No. M-15 to conserve the supply and direct the distribution of rubber. (See INDIA RUBBER WORLD, July 1, 1941, pp. 43-44; Sept. 1, 1941, pp. 29, 42.

Rubber Questionnaire—2nd Quarter 1941*

RECLAIMED RUBBER	Long Tons: Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (6)	3,054	26,024	27,940	......
Manufacturers who also reclaim (18)	6,773	21,278	3,356	23,434
Other manufacturers (136)	7,520	......	......	19,258
Totals	17,347	47,302	31,296	42,692

SCRAP RUBBER	Long Tons: Inventory	Consumption	Due on Contracts
Reclaimers solely (6)	34,232	28,713	34,867
Manufacturers who also reclaim (15)	58,094	24,598	13,479
Other manufacturers (23)	275	......	......
Totals	92,601	53,311	48,346

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Accessories		
Passenger car, truck, and bus casings	99,413	$130,345,000
Inner tubes for passenger cars, trucks, and buses	14,476	14,747,000
Farm tractors and implement casings and tubes	5,388	6,285,000
Airplane tires and tubes	397	1,058,000
Motorcycle casings and tubes	93	128,000
Bicycle tires, including juvenile pneumatics (single tubes, casings and tubes)	821	2,048,000
Solid and cushion tires for highway transportation	45	217,000
All other solid and cushion tires	635	900,000
Tire sundries and repair materials	3,687	4,274,000
Totals	124,955	$160,002,000
Other Rubber Products		
Mechanical rubber goods	19,377	$62,046,000
Boots and shoes	6,372	14,390,000
Insulated wire and cable compounds	4,401	†
Druggists' sundries, medical and surgical rubber goods	1,563	3,987,000
Stationers' rubber goods	777	1,050,000
Bathing apparel	231	1,147,000
Miscellaneous rubber sundries	1,140	4,900,000
Rubber clothing	463	2,735,000
Automobile fabrics	92	379,000
Other rubberized fabrics	1,743	6,260,000
Hard rubber goods	1,754	3,999,000
Heels and soles	3,697	6,691,000
Rubber flooring	433	747,000
Industrial sponge rubber; chemically blown	3,755	2,674,000
Foamed latex		2,092,000
Sporting goods, toys, and novelties	808	2,233,000
Totals	46,606	$115,330,000
Grand totals—all products	171,561	$275,332,000

Inventory of Rubber in the United States and Afloat

	Long Tons: Crude Rubber on Hand	Crude Rubber Afloat
Manufacturers	82,001	24,850
Importers and dealers	12,647	106,129
U. S. Government	206,003	.....
Totals	300,651	130,979‡

*Number of rubber manufacturers that reported data was 218; crude rubber importers and dealers, 50; reclaimers (solely), 6; total daily average number of employes (reporting manufacturers and reclaimers), 171,533.

It is estimated that the reported grand total crude rubber consumption in 75.4%; grand total sales value, 75%; the grand total crude rubber inventory, 88.7%; afloat figures, unavailable; the reclaimed rubber production, 69.4%; reclaimed consumption, 66.4%; and reclaimed inventory, 47.8% of the total of the entire industry.

†Owing to the difficulty of securing representative sales figures this item has been discontinued. ‡Including U. S. Government rubber.

Compiled from R.M.A. statistics.

New Zealand

The import control system, introduced in 1938, has favored the establishment of a rubber manufacturing industry in New Zealand, and it is expected that before long home production will be able to supply the entire demand for most kinds of rubber goods. In all eight firms are active in this field, five of which are older companies; while the other three are newcomers. In 1940 they employed about 600 persons altogether, but it is expected that this number will be considerably increased in the near future when the new firms get into their stride and some of the older ones have completed extensions they are planning.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	—September, 1941—		Nine Months Ended —September, 1941—	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc. .... *lb.*	37,923,222	$8,161,198	123,620,835	$26,600,359
Latex (dry weight) ...... *lb.*	369,999	112,774	3,623,791	1,086,404
Gutta percha .... *lb.*	......	......	11,182	6,051
Rubber, recovered .... *lb.*	1,926,000	111,280	13,740,900	785,783
Rubber, powdered, and gutta percha scrap .... *lb.*	904,800	17,705	4,936,400	99,683
Balata .... *lb.*	2,057	559	48,189	13,532
Rubber substitute .... *lb.*	71,600	23,983	459,100	147,217
Totals	41,197,678	$8,427,499	146,440,397	$28,739,029
PARTLY MANUFACTURED				
Hard rubber comb blanks....	......	$2,597	......	$31,693
Hard rubber, n. o. s....... *lb.*	3,980	5,019	44,765	40,842
Rubber thread not coveied. *lb.*	659	963	34,984	35,612
Totals	4,639	$8,579	79,749	$108,147
MANUFACTURED				
Bathing shoes .... *prs.*	......	......	35,177	$7,134
Belting	......	$20,904	......	148,014
Hose	......	18,969	......	235,236
Packing	......	13,258	......	86,302
Boots and shoes .... *prs.*	1,330	2,732	6,893	12,725
Canvas shoes with rubber soles .... *prs.*	18,600	4,938	29,519	9,350
Clothing, including waterproofed	......	3,294	......	32,027
Raincoats .... *no.*	11,080	56,563	52,443	206,497
Gloves .... *doz. prs.*	7	149	1,125	4,592
Hot water bottles...........	......	3,252	......	7,175
Liquid sealing compound	......	7,465	......	70,673
Tires, bicycle .... *no.*	1,514	1,010	19,795	14,801
Pneumatic .... *no.*	1,878	33,647	22,720	553,422
Solid for automobiles and motor trucks .... *no.*	75	2,057	349	17,659
Other solid tires	......	1,018	......	18,792
Inner tubes .... *no.*	410	860	14,221	48,467
Bicycle .... *no.*	842	285	15,007	4,190
Mats and matting	......	17,823	......	96,111
Cement	......	20,361	......	128,512
Golf balls .... *doz. prs.*	951	1,792	17,627	34,099
Heels .... *prs.*	7,075	415	75,709	5,208
Other rubber manufactures..	......	238,442	......	1,897,018
Totals	......	$449,234	......	$3,638,004
Totals, rubber imports..	......	$8,885,312	......	$32,485,180

Exports of Domestic and Foreign Rubber Goods

UNMANUFACTURED	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Crude rubber	......	......	$73	......
Waste rubber	$50,686	......	239,671	......
MANUFACTURED				
Belting	$54,470	......	$378,824	......
Bathing caps	......	......	3,033	......
Canvas shoes with rubber soles.	22,868	......	302,474	......
Boots and shoes	243,925	......	1,320,901	......
Clothing, including waterproofed	22,287	......	217,739	......
Heels	2,402	......	18,390	......
Hose	71,837	......	1,901,430	......
Soles	198	......	8,688	......
Soling slabs	1,678	......	8,641	......
Tires, pneumatic	707,306	......	3,958,609	......
Not otherwise provided for.	18,383	......	667,686	......
Inner tubes	63,954	......	410,353	......
Other rubber manufactures..	43,471	......	342,892	......
Totals	$1,252,779	......	$9,539,660	......
Totals rubber exports...	$1,303,465	......	$9,779,404	......

Imports by Customs Districts

	—August, 1941— *Crude Rubber		—August, 1940— *Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	14,799,992	$2,793,756	12,310,875	$2,184,387
Buffalo	430	77	......	......
New York	113,556,315	21,532,979	122,747,715	21,759,118
Philadelphia	29,787	7,617	5,780,178	936,494
Maryland	26,887,864	4,991,402	2,382,960	401,868
Mobile	......	......	2,754,448	453,277
New Orleans	1,881,530	332,405	8,567,697	1,408,945
Laredo	185,630	16,124	......	......
Galveston	......	......	201,785	34,929
El Paso	67,200	6,955	88,300	7,660
Los Angeles	75,087,813	14,130,094	7,754,341	1,332,381
San Francisco	2,995,753	575,105	347,404	63,173
Ohio	1,746,440	342,539	311,820	51,488
Colorado	1,410,400	262,586	336,000	57,158
Totals	238,649,154	$44,991,639	163,583,523	$28,690,878

* Crude rubber including latex dry rubber content.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	July, 1941		Seven Months Ended July, 1941	
	Quantity	Value	Quantity	Value
UNMANUFACTURED—*Free*				
Liquid latex (solids) ...... *lb.*	4,589,007	$930,126	34,006,598	$6,706,127
Jelutong or pontianak ..... *lb.*	1,860,175	215,176	10,965,376	1,597,881
Balata .... *lb.*	223,415	34,119	951,366	199,350
Gutta percha .... *lb.*	229,030	30,948	2,059,121	334,708
Guayule .... *lb.*	919,800	94,874	6,061,800	622,410
Scrap and reclaimed ..... *lb.*	1,973,476	59,496	10,215,930	242,349
Crepe soled rubber .... *lb.*	4,392	959	253,791	56,691
Totals	9,799,295	$1,365,698	64,513,982	$9,759,516
Misc. rubber (above), 1,000 *lbs.*	9,799	$1,365,698	64,513,982	$9,759,516
Crude rubber ...... 1,000 *lbs.*	211,953	39,296,581	1,246,355	224,078,373
Totals .... 1,000 *lbs.*	221,752	$40,662,279	65,760,337	$233,837,889
Chicle, crude .... *lb.*	375,304	$70,477	10,032,963	$3,703,019
MANUFACTURED—*Dutiable*				
Rubber tires .... *no.*	1	$7	3,955	$67,560
Rubber boots, shoes and overshoes .... *prs.*	49	81	18,434	7,043
Rubber soled footwear with fabric uppers .... *prs.*	44,814	7,986	586,775	116,219
Golf balls .... *no.*	46,776	5,081	298,656	33,220
Lawn tennis balls .... *no.*	2,400	341	225,336	30,914
Other rubber balls .... *no.*	65,232	1,373	1,246,305	25,960
Other rubber toys	......	378	......	7,057
Hard rubber combs ...... *no.*	......	......	......	......
Other manufactures of hard rubber	......	15	......	184
Friction or insulating tape.. *lb.*	5,461	3,908	23,381	15,398
Belts, hose, packing, and insulating material	......	1,188	......	51,922
Druggists' sundries of soft rubber	......	1,735	......	3,446
Inflatable swimming belts, floats, etc. .... *no.*	1,200	284	235,846	21,889
Other rubber and gutta percha manufactures	......	13,048	......	86,556
Totals	......	$35,425	......	$467,368

Exports of Foreign Merchandise

	July, 1941		Seven Months Ended July, 1941	
	Quantity	Value	Quantity	Value
RUBBER AND MANUFACTURES				
Crude rubber .... *lb.*	947,603	$219,597	5,488,588	$1,226,610
Balata .... *lb.*	18,366	7,279	173,542	69,602
Other rubber, rubber substitutes and scrap .... *lb.*	......	......	16,771	4,651
Rubber manufactures (including toys)	......	32,481	......	147,377
Totals	......	$259,357	......	$1,448,240

Exports of Domestic Merchandise

	July, 1941		Seven Months Ended July, 1941	
	Quantity	Value	Quantity	Value
RUBBER AND MANUFACTURES				
Reclaimed .... *lb.*	2,215,773	$130,691	15,071,929	$803,942
Scrap .... *lb.*	2,092,548	28,458	33,849,583	510,513
Cements .... *gal.*	12,415	12,255	180,710	173,842
Rubberized auto cloth. *sq. yd.*	22,202	9,758	177,996	80,816
Other rubberized piece goods and hospital sheetings. *sq. yd.*	193,775	68,150	1,986,604	898,323
Boots .... *prs.*	3,187	8,703	54,612	128,561
Shoes .... *prs.*	8,945	7,624	125,609	87,548
Canvas shoes with rubber soles .... *prs.*	70,297	60,026	530,485	410,253
Soles .... *doz. prs.*	2,805	7,093	51,686	70,398
Heels .... *doz. prs.*	10,447	7,245	200,790	109,201
Soling and top lift sheets.. *lb.*	41,533	14,335	242,458	60,992
Gloves and mittens.. *doz. prs.*	20,611	34,576	70,656	140,326
Water bottles and fountain syringes .... *no.*	48,835	15,661	302,678	97,862
Other druggists' sundries....	......	67,101	......	607,603
Gum rubber clothing.... *doz.*	10,815	25,340	105,471	261,981
Balloons .... *gross*	20,359	15,966	125,885	107,478
Toys and balls	......	11,554	......	75,843
Bathing caps .... *doz.*	2,546	4,486	26,217	47,505
Bands .... *lb.*	9,390	4,036	92,584	42,413
Erasers .... *lb.*	21,794	12,212	147,135	84,085
Hard rubber goods				
Electrical battery boxes. *no.*	18,265	11,957	190,113	142,846
Other electrical .... *lb.*	29,590	11,642	281,194	89,888
Combs, finished ...... *doz.*	52,539	27,400	237,175	117,786
Other hard rubber goods....	......	6,031	......	131,431
Tires				
Truck and bus casings.. *no.*	44,609	1,004,636	438,909	10,142,249
Other auto casings..... *no.*	53,006	662,725	438,308	5,489,326
Tubes, auto .... *no.*	63,247	141,783	647,928	1,455,489
Other casings and tubes.. *no.*	7,948	93,172	138,387	1,414,570
Solid tires for automobiles and motor trucks..... *no.*	121	4,623	2,536	63,537
Other solid tires........ *lb.*	7,412	2,265	499,450	81,309
Tire sundries and repair materials .... *lb.*	190,496	64,223	1,675,374	493,338
Rubber and friction tape.. *lb.*	50,672	16,252	403,518	122,923
Fan belts for automobiles. *lb.*	63,358	28,249	276,796	135,465
Other rubber and balata belts .... *lb.*	414,365	217,989	2,163,698	1,127,781
Garden hose .... *lb.*	55,621	10,980	349,719	68,939
Other hose and tubing.... *lb.*	427,836	205,927	4,226,280	1,916,893
Packing .... *lb.*	111,834	51,216	939,028	408,472
Mats, matting, flooring, and tiling .... *lb.*	72,526	11,971	848,950	120,267
Thread .... *lb.*	33,124	27,613	202,820	185,099
Gutta percha manufactures. *lb.*	9,564	4,269	360,059	121,193
Latex (d.r.c.) and rubber sheets processed for further manufacture ...... *lb.*	110,702	29,116	1,222,003	246,328
Synthetic rubber (bulk)... *lb.*	36,446	18,130	621,241	318,613
Other rubber manufactures..	......	161,396	......	1,147,566
Totals	......	$3,358,835	......	$30,340,793

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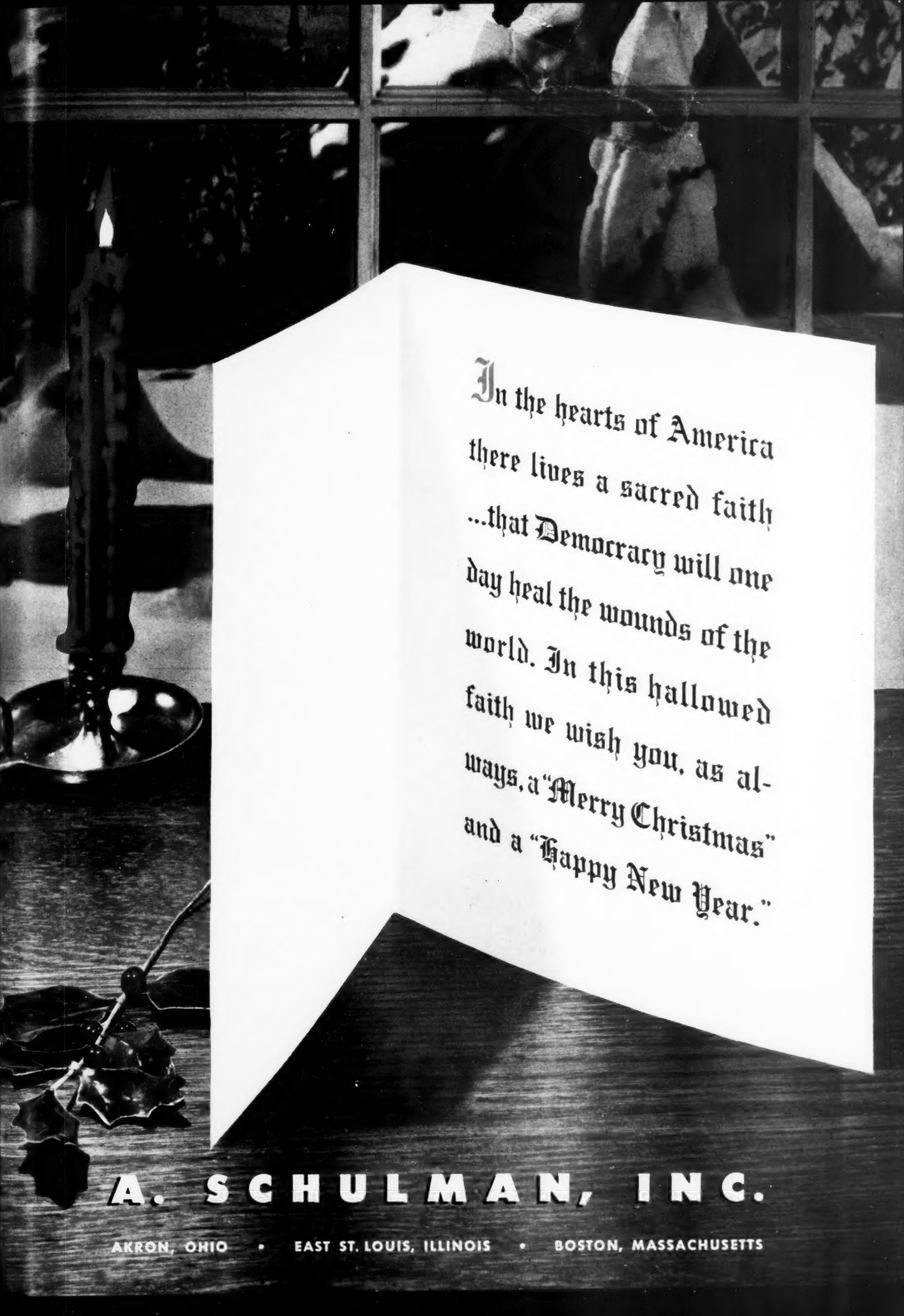
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